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IQAN
Electronic Control Systems

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ENGINEERING YOUR SUCCESS.

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IQAN Software Studios Software Tools

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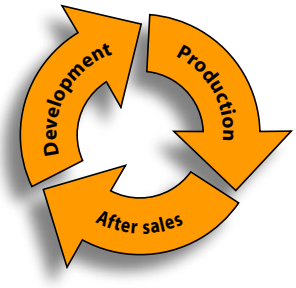
Machine life cycle model

Having previously been a traditional purchase/sales component, today's control system involves the whole chain of a machine's life, known as its life-cycle cost. LCC plays an increasingly strong role in the end user's decision. It is no longer based on just the up-front product cost.



This puts new demands on the level of co-operation between suppliers and the OEM, on more than the traditional R&D level. Today, an OEM's production department wants to automate, log and trace the delivery status; the service department wants to handle warranties, offer proactive maintenance and download machine upgrades; and the machine owner wants a reliable machine with high productivity and low downtime. To meet all these demands, IQAN Software Studios were designed to fulfill the needs of the machine life cycle model.

The machine life cycle is divided into three phases; development, production and after sales.

Development

The OEM development team considers time to market as one of the most important factors for return on investment. Time to market is primarily set by design time, application programming, simulating, verifying and creating documentation. Finally, the machine is commissioned for production, where user friendly, high-capacity software is essential to meet these demands.

Production

The production department constantly strives for improved quality, simpler configuration, faster start-up and reduced production line set-up time, with the possibility to trace and record delivery status.

After sales

The after sales department wants a reliable machine with minimum downtime, simple maintenance, maximum field service support and the possibility of following up warranty issues.

Software tools

The IQAN software studios cover all phases of a machine's life cycle, from development through production to after sales. There are three different studios available; IQAN Creative Studio, IQAN Productive Studio and IQAN Active Studio.

IQAN Creative studio

IQAN Creative studio is a user-programmable software package for the R&D department. It includes tools for application development, simulation and initial setup.

- IQANdesign
- IQANsimulate
- IQANrun

IQAN Productive studio

IQAN Productive studio is a software package for the manufacturing and service departments. It includes development tools for customization and automation of production and maintenance processes.

- IQANscript
- IQANcustomize
- IQANsimulate
- IQANrun

IQAN Active studio

IQAN Active studio is a software package for service and production personnel. It includes tools for machine diagnostics, setup and simulation.

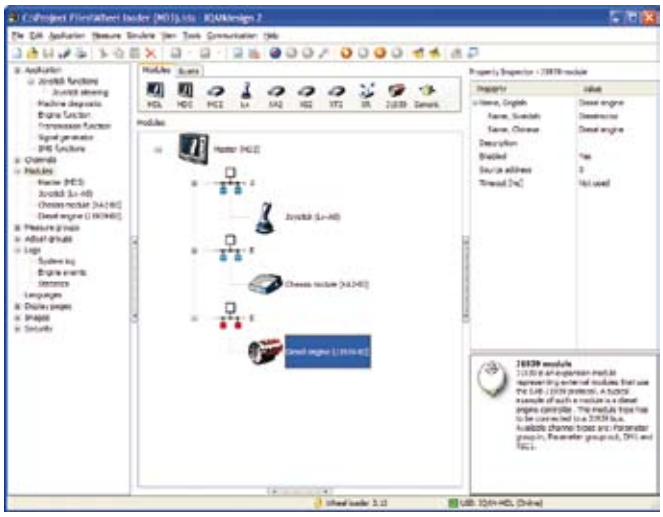
- IQANrun
- IQANsimulate

IQAN Creative Studio

The main philosophy behind the IQAN Creative Studio is that the OEM, with their extensive knowledge of their machine, should be able to write the desired machine functionality directly, without having programming experience.

IQANdesign

IQANdesign is a high level graphical design tool which simplifies application development for your mobile machine and reduces development time.



IQANdesign main window.

This tool is mainly used for system layout and machine function design. There is a wide range of predefined building blocks available, such as closed loop control, signal processing, math calculations, communication protocols (e.g. SAE J1939) and system diagnostics.

In addition to machine function design IQANdesign also provides a simple way to accomplish display page programming using a simple drag and drop interface. The menu system can be customized as well.

Integrated machine security access control allows you to grant appropriate access to production and service personnel during the application development process. IQANdesign also allows you to create all of the desired machine logging capabilities and methods for gathering statistics.

IQANdesign supports multiple languages within one application, even languages with symbol based alphabets, such as Chinese.

IQAN-MD3 master display with Chinese characters.

IQANsimulate

IQANsimulate is a simulation tool, which simplifies function test, validation and reduces development time. It simulates all of the hardware modules in an IQAN application. Software simulation is a safer way to test new applications than on an actual machine.

Simulation of all input values in your application is easy using the on screen slide bar interface. While simulating inputs you can simultaneously measure the resulting output values. Together with module and I/O error simulation you will be able to perform machine FMEA (Failure Modes and Effects Analysis).

The simulator will behave just like the “real thing”, meaning you will be able to look at your display pages, adjust parameters, view logs, test your user interface and much more.

IQANsimulate run mode.

IQANrun

During the development phase you can use IQANrun to optimize your machine’s performance with the help of IQANrun’s advanced graphical measure and machine statistics collection functions.

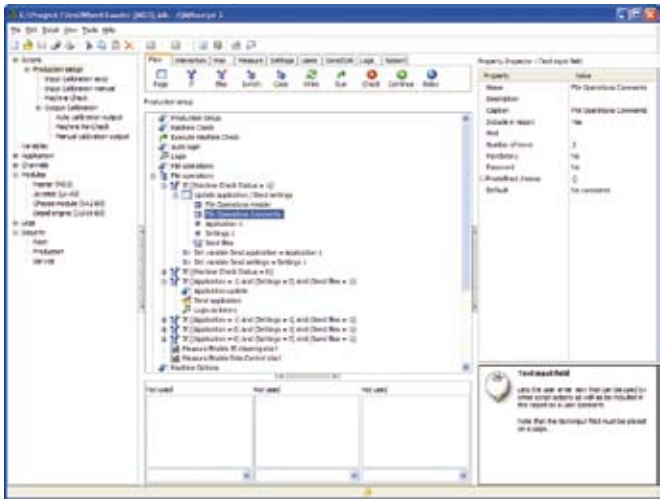
IQANrun also offers a convenient way of developing the basic machine settings during the prototyping phase.

IQAN Productive Studio - Script

The script concept was developed to help OEM production departments to create routines for testing, tuning, setting options, logging, delivery sheets, etc. The service department can also take advantage of scripts to create tailor-made fault-finding trees, service procedures, intervals and much more.

IQANscript

With IQANscript you create scripts using simple drag and drop operations. Each script is a sequence of actions that can be executed in IQANrun. A wide range of script actions are available to build scripts for different purposes.



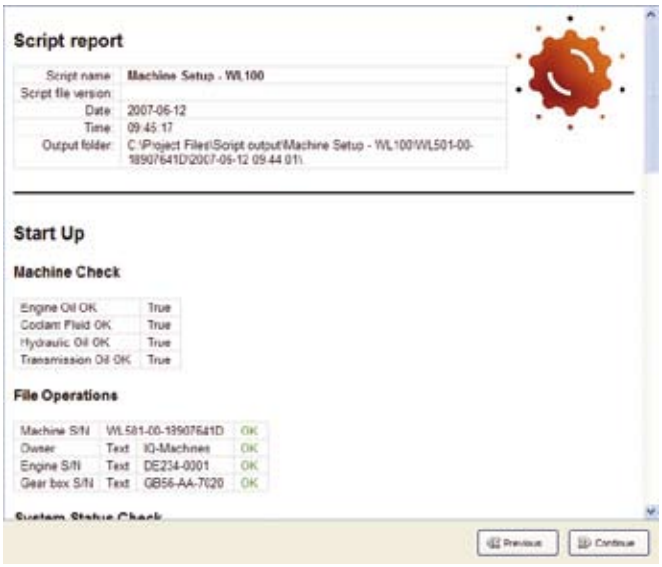
IQANscript main window.

Using flow control actions such as conditions and loops you can control how the script is executed. With the different measure and log actions, information can be retrieved from the master units to be analyzed by the script or displayed to the user.

Setting actions provide full control of the master settings, making it possible to fine tune the machine using a script.

IQANscript provides powerful building blocks for the script user interface. Using formatted text and images the script user is guided through otherwise complex operations. Input from the user can also be collected and used by the script.

To provide traceability you can include a customized report in the script. When the script is executed the results will be recorded in the report, making it possible to get a good overview as well as saving the report for future use.



Script report.

Script examples

IQANscript allows you to design machine startups with secured and standardized procedures. This increases manufacturing productivity and initial machine quality.

Using IQANscript you can also control your service procedures. This increases field service integrity and long term machine quality. IQANscript can control equipment service schedules through inspection and error log's.

By creating troubleshooting scripts you can guide service personnel during the fault finding process. This decreases the fault finding time and makes it possible for less trained personnel to find problems that otherwise would require expert knowledge.

IQANrun

During the script design phase you can use IQANrun to execute scripts. This allows you to debug and optimize them.

When using IQANrun for debugging scripts, extra debug information is available. This makes it possible to trace the flow of the script while it is executed to find problems in the script design.

IQANsimulate

IQANsimulate can be used instead of a “real” master module when debugging your scripts before sending them to the production floor or field.

IQAN Productive Studio - Customize

Today, service technicians have a large number of tools and documents to keep track of. Sometimes, it is hard for them to find the right information and to be sure they use the correct version of a software or document.

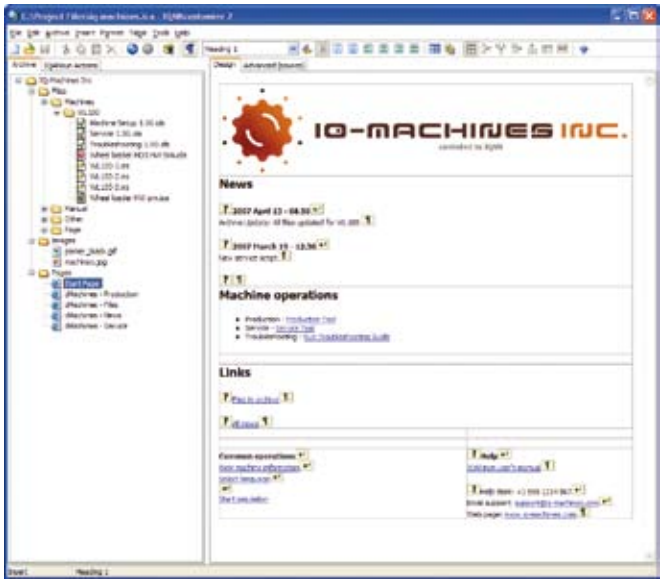
The customize feature in IQAN Productive Studio was developed to solve this problem. It allows you to collect all machine software and information in one user interface and to distribute it to your users quickly and easily via the web.

IQANcustomize

IQANcustomize is a tool that enables customization of the IQANrun software functions and appearance to create a unique service and production tool. This is done by creating one or more pages using the graphical page editor in IQANcustomize. The editor is fully HTML compatible.

The pages can contain specific information for each machine type and will be displayed when IQANrun is started. Your company logo, graphics, links and information may all be integrated in the user interface of IQANrun. Using IQANcustomize you can also show or hide IQANrun functions, or make them available as links on any page, to assist users through a troubleshooting or tuning process.

IQANcustomize has a built-in function that allows you to upload changes to your company update server. This way you can easily distribute information, the latest version of manuals, applications and other files to a large number of users.



IQANcustomize main window.

Archive examples

An archive is where IQANcustomize stores all information used in the customized IQANrun. It can contain anything from machine application and settings to instructions and manuals.

Start page in IQANrun using an archive.

Production archive

Production procedures, machine setup scripts, application and setting files, pre-delivery inspection scripts.

Service archive

Service manuals, service instructions and scripts, fault finding guides.

Machine owner archive

Machine documentation, manuals, videos, machine productivity and fuel consumption measurement.

IQANrun

During the archive design phase you will use IQANrun to view and optimize the user interface of your archive pages.

IQANsimulate

With the help of IQANsimulate you can easily test your archive before uploading them to the field.

IQAN Active Studio

Getting a machine design into production is time consuming. Testing equipment and procedures have to be developed and machine start-up and delivery status have to be recorded. Fortunately, IQANrun is tailor-made to fulfill all of these demands. IQANrun may also be used by the service department and can be adapted to feature machine-specific procedures for maintenance, fault finding and web supported machine upgrades, while the machine owner can access spare parts manuals, maintenance videos, service intervals and service suggestions via IQANrun.

IQANrun

IQANrun software is a user-friendly service, production and machine owner tool which includes a powerful, graphical measure capability and simplifies machine tuning for increased productivity.

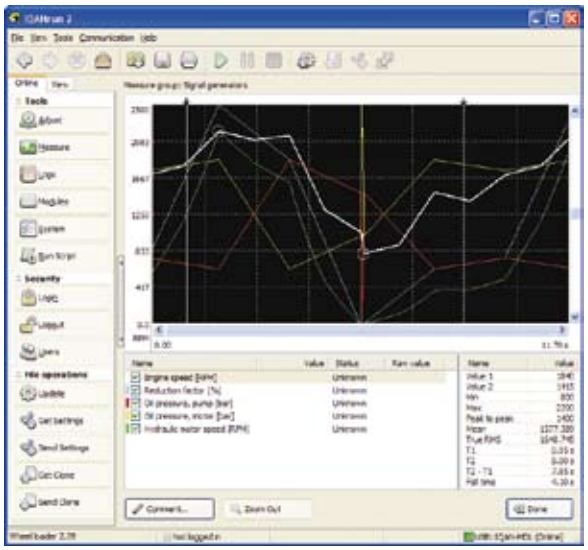
Machine optimization

To help optimize your machines, IQANrun has functions for adjusting inputs, outputs and parameters. There is also a settings viewer that gives a good overview of the complete machine setup.

Troubleshooting

IQANrun is a powerful troubleshooting tool. It has several measuring functions built-in, both numerical and graphical. You can measure scaled value, raw value (mV, mA, etc) and status.

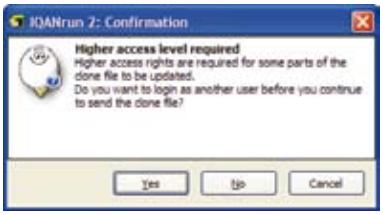
Features include an application viewer, log management and system status screens. There is even a function that lets you compare the settings of two machines, value by value, to help you find differences.



IQANrun graphical measure.

Security

IQANrun comes with full support for all security functions built into IQAN. It allows you to login to your machines and to give access to functions and parameters that are protected by the application.


IQANrun 2: Confirmation
Higher access level required
Higher access rights are required for some parts of the clone file to be updated.
Do you want to login as another user before you continue to send the clone file?
Yes
No
Cancel

IQANrun security message.

Customization

IQANrun can be customized to create a user friendly interface that fits the end user's needs perfectly. It is possible to embed documents of all kinds, images and videos. Links can be added to external web sites or other programs installed on the same computer.

The customized user interface can easily be updated by the click of a single menu item – Check For Updates. This will search for updated pages and documents on the OEM's web site, download and install them on the local computer.

Scripts

Script execution is a useful feature in IQANrun. It allows you to run automated procedures for production, service or troubleshooting.

IQANsimulate

IQANsimulate software is a simulation tool that can be used together with IQANrun to do desktop support or class room trainings. It simulates a complete IQAN system without the need for any hardware.

Support call center

By the use of clone files you can receive an exact copy of your client's machine with application, settings and logs. The clone file can be used by IQANsimulate to do an exact simulation of that machine. This will allow call center personnel to do phone support without the need for any IQAN hardware.

Training/education

IQANsimulate offers an exact copy of the master module display and its user interface, which makes it an excellent tool for class room training. Running it on a large screen will allow you to present display pages and menu system for a large group of students.

Ordering part numbers

20073643
IQAN Creative Studio

20073644
IQAN Productive Studio

20073642
IQAN Active Studio

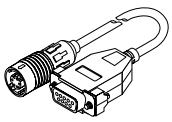
Operating system requirements

Windows® 2000, XP or Vista (XP or Vista recommended).

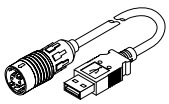
IQAN Software Studios are delivered on CD-ROM. Printed user manuals and cables are not included. Order the accessories you need from the list below.

Accessories

5030103
RS-232 cable: 1,5 meters, fits to IQAN-MDL (for PC connection to IQANdesign and IQANrun)

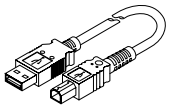


5030110
USB cable: 1,5 meters, fits to IQAN-MDL (for PC connection to IQANdesign and IQANrun)



5030124
Panel mount USB adapter cable: 0,4 meter, fits to IQAN-MC2, IQAN-MD3

From a retail store
USB A-B cable: 1,5 meters, fits to 5030124 (for PC connection to IQANdesign and IQANrun)



HY17-8396/UK
IQAN Creative Studio
User Manual

HY17-8397/UK
IQAN Productive Studio
User Manual

HY17-8398/UK
IQAN Active Studio
User Manual

Please order printed manuals from Parker Catalogue Services.

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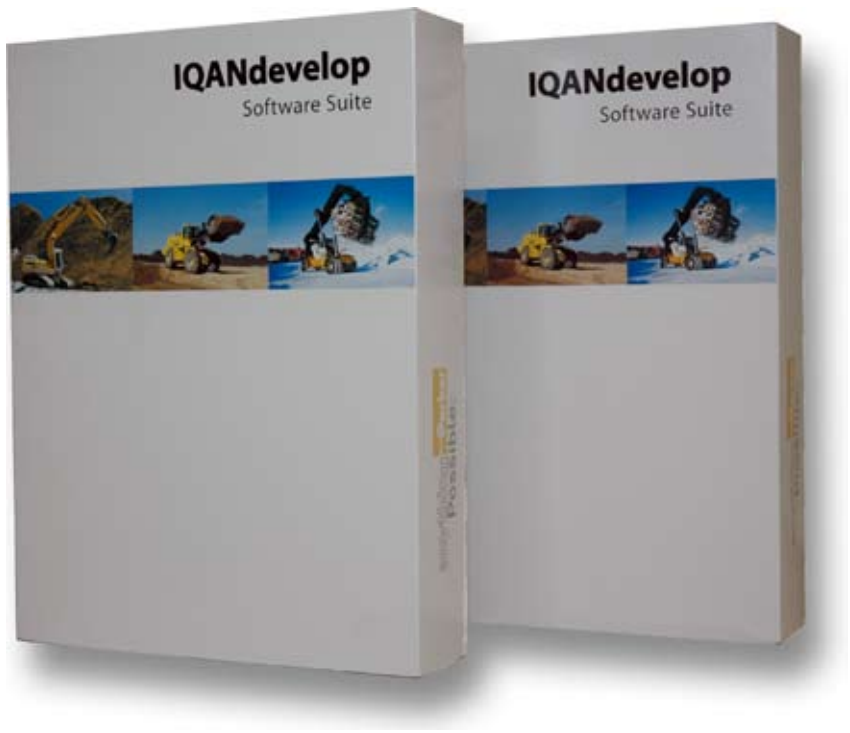

IQANdevelop Software

Electronic Control Systems

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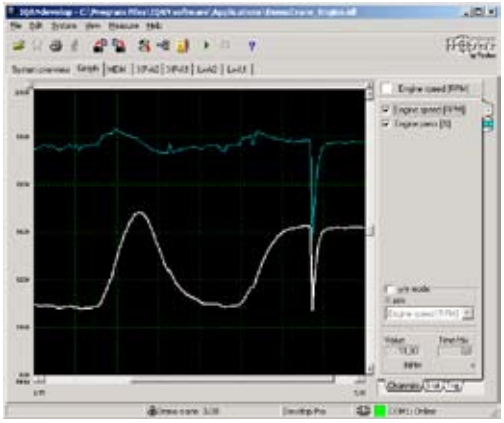
Application

IQANdevelop is a software tool for adding modules and channels to the IQAN control system, in order to build functions for the developer's mobile machine application. IQANdevelop supports systems that are using the IQAN-MDM master/display module or the IQAN-TOC8 and IQAN-TOC2 stand-alone modules.

The software is based on the different modules' block diagrams. To add a new module, you create a new block diagram. From the block diagram it is easy to set/edit channel parameters and measure the IQAN system.

With the navigator function in IQANdevelop you get an overview of the connected channels in a specific function. In this way it is easy to see how the channels interact with each other.

IQANdevelop is also a tool for measuring and troubleshooting IQAN systems. With a logging function,



measurements can be viewed graphically.

IQANdevelop PRO also includes IQANsimulate. IQANsimulate allows you to verify application functions at your desk. See IQANsimulate data sheet for more information.

Design

IQANdevelop is a Windows® based software running on Windows® 95/98, NT® 4.0, 2000 or XP. It has a user-friendly interface, featuring speed-buttons, status bar and a complete on-line help system. The software is available in the English language.

IQANdevelop is well documented, with a comprehensive user´s manual and a tutorial.

Communication with the IQAN system is done via the computer's standard RS232 serial port. For PC's with only USB ports an adapter will be needed.

Parameter handling

The channels may be monitored, calibrated and adjusted.

It is possible to set parameters for each channel such as name, unit, min- and max-current, alarm limits and slope times.

A channel error is instantly presented when monitoring.

Machine data

All data from the IQAN system can be saved on file which enables the user to make backup copies of the system information. The file fits easily on a standard 3,5" floppy disk or can be sent via modem/Internet.

Logging

The logger graphically presents measurement signals as a function of time and includes the provision of statistical functions such as minima, maxima, averages and true RMS. A trigger function is also built-in.

Levels

IQANdevelop is divided into four levels:

- Read
- Change
- Develop
- Develop PRO, (includes IQANsimulate)

With the *read* level the user can get information about the application and measure channels. To set parameters and see the application functions the user needs the *change* level. The *Develop* and *Develop PRO* levels give the user access to add modules and to build new functions in the IQAN system. In addition, *Develop PRO* gives access to add and change functions for the internal channels.

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Mobile Controls Division Europe
Borås, Sweden

Contents

When ordering IQANdevelop, following items are included:

- IQANdevelop/simulate software CD-ROM
- 1 software licence
- 1 serial cable, 5030024
- 1 IQANsimulate cable, 5030034 (PRO only)

Requirements

CPU	PC compatible, Pentium or better
RAM	minimum 32 Mbyte (64 Mbyte recommended)
HD	25 Mbyte memory space available
Ports	serial port RS232
Software	Windows® 95/98, NT® 4.0, 2000, XP

Upgrade

It is always possible to download the latest version from our web site www.iqan.com.

Ordering part numbers

IQANdevelop Develop PRO	20005607
IQANdevelop Develop	20004179
IQANdevelop Change	20005606
IQANdevelop Read	no licence

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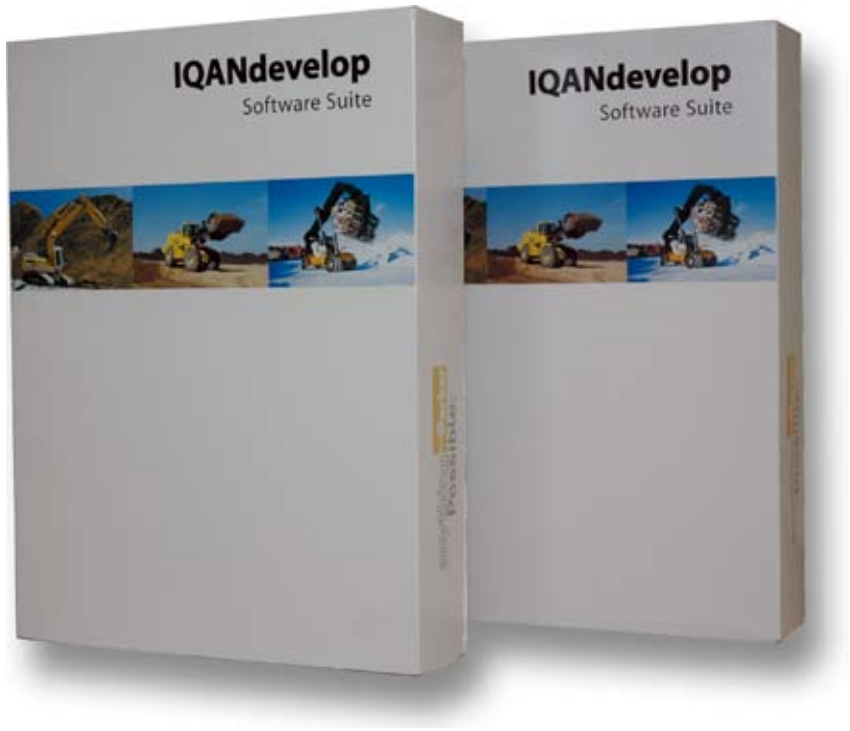

IQANsimulate Software

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Application

IQANsimulate is a software tool, included in the IQANdevelop PRO kit, for simulating expansion modules for IQAN control systems. It is used for testing and evaluating mobile machine applications.

The master unit, IQAN-MDM, cannot tell any difference between IQANsimulate and real expansion modules. You are able to interact with the master unit in real time and can verify the response from the modules. In this way, you can confirm your application's functionality before sending it to your machine.

The software is based on the IQAN system's modules. Each expansion module, defined in an IQANdevelop application, is represented by a module

panel in the main window. These module panels contain controls for every input channel and indicators for every output channel on the module. As you change the input values, you will see how the outputs change in accordance with your functions. You can also simulate error conditions such as signal shorted to ground or supply.

Design

IQANsimulate is a Windows® based software running on Windows 95/98, NT®. It has a user-friendly interface, with track bars and edit boxes for simulation, bar graphs and lamps to show the result of your simulation and a status bar.

The software as well as the user manual are in English.

IQANsimulate uses CAN to communicate with the master module.

CAN communication

Because IQANsimulate uses CAN for communication, a National Instruments CAN card (www.ni.com) has to be installed in the computer.

National Instruments order numbers:

Desktop, PCI-CAN p/n 777357-01
Laptop, PCMCIA-CAN p/n 777499-01

For communication, a CAN cable has to be connected between the IQAN-MDM and the PC.

How to use IQANsimulate

To test an application in IQANsimulate, it first has to be created in IQANdevelop. To simulate, the same application file that is downloaded into IQAN-MDM has to be open in IQANsimulate.

If there are any errors found in the tested application, it is easy to switch to IQANdevelop to review the function's composition to find the error.

IQANsimulate is capable of synchronizing its current application to IQANdevelop (version 2.0 or later) when they are run on the same computer. This allows IQANsimulate to automatically load any application that is uploaded from or downloaded to the master with IQANdevelop.

IQANsimulate contains functions for import and export. These functions are used in order to save and open settings for an application.

Protection

In IQANdevelop it is possible to protect an application from unauthorized users by creating a code. To open a protected application in IQANsimulate, the code must be entered to get access.

Contents

IQANsimulate is included in the IQANdevelop PRO kit and cannot be ordered separately. The following items are included in the IQANdevelop PRO kit:

- A CD-ROM containing IQANdevelop and IQANsimulate software
- 1 software licence
- 1 serial cable (5030024)
- 1 CAN cable (5030034)

Requirements IQANdevelop/IQANsimulate

CPU	PC compatible, Pentium or better
RAM	minimum 32 Mbyte (64 Mbyte recommended)
HD	25 Mbyte memory space available
Ports	serial port RS232
Software	Windows® 95/98, NT® 4.0, 2000, XP
Misc.	1 PCI slot available or PCMCIA 1 CAN card 1 IQAN-MDM

Upgrade

It is always possible to download the latest IQANsimulate version from our web site www.iqan.com.

Ordering part number

incuded with:

IQANdevelop Develop PRO	20005607

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IQAN-MDM Display Modules

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Application

The IQAN-MDM is a master unit that works with the expansion modules in the IQANdevelop platform control system. The IQAN-MDM is fully programmable for use in any machine application. The unit works as a master for controlling applications, as a graphical user interface and as a CAN interface.

Design and function

IQAN-MDM uses an improved 2.8" FSTN, black & white LCD for the best readability in all lighting conditions. The improved display uses Chip-On-Glass technology for higher reliability.

Function buttons and control buttons in combination with a graphical display makes system feedback with user interaction possible. With the three function buttons, a decrease/increase value-button and an escape-button, it is easy to adjust, calibrate and measure the IQAN system. In case of an error the display will alert the operator with a signal and a message on the display.

IQAN-MDM is designed for in-cab as well as outdoor use. It can be used in both 12 and 24 Vdc systems. All inputs and outputs are protected against short circuit to ground, to main power supply and reversed polarity.

The IQAN-MDM is connected to other units by a CAN bus. The CAN bus may be configured as ICP (IQAN CAN Protocol), SAE J1939 or Generic CAN. The RS232 interface is used for connection with PC and for land line or wireless modem (remote diagnostic) connection.

Up to 4 different individual driver modes can be stored in the unit, which are easily selectable. The display also contains a real time clock, an alarm output and can present text in 10 different languages.

A green LED indicator on the back of the module indicates supply voltage and status "heartbeat".

General

Weight	0,2 kg
Rated power supply	12-24 Vdc
Min/max power	9/32 Vdc
Operating temperature	-30°C to +70°C (-30°C to -10°C reduced display update)
Protection	outdoor use
Current consumption	max 100 mA (28 Vdc), max 180 mA (14 Vdc)
Data interface	Parker ICP (IQAN CAN Protocol)

Display

Type	2.8" B/W LCD
Resolution	202x32 pixels

Performance

Processor	16-bit (16 MHz)
Sample time	20-100 ms
Software tools	IQANdevelop family

Communication interfaces

CAN (ISO 11898)	1
Protocols	ICP, SAE J1939, CANopen, etc
RS-232	1
Protocols	AT-Hayes,GSM07.07, GSM07.05, IDP

Outputs

Digital output	1
Type	high side switch
Max load	1,2 A
Buzzer	Sound alarm output

Ordering part no.

IQAN-MDM	5010010

Environmental Protection

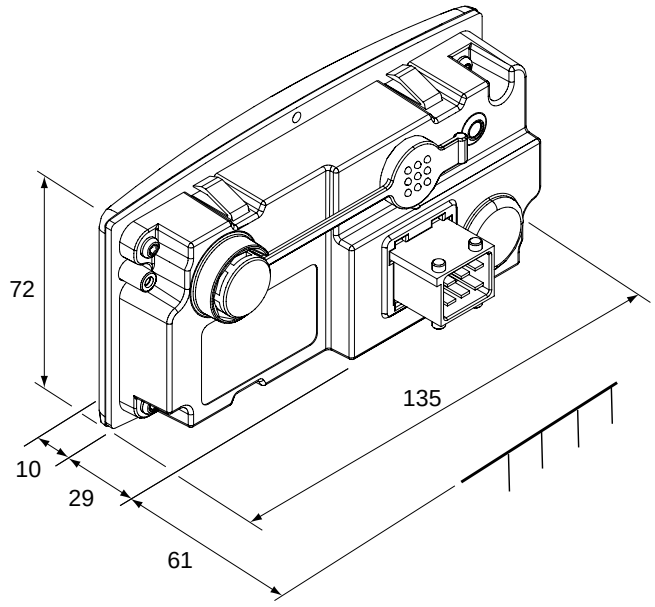
EMI
ISO 14982:1998, Radiated emission
EN 55025:2003, Conducted emission
ISO 11452-2:1995, Radiated susceptibility
ISO 11452-4:2001, Conducted susceptibility
ISO 7637-2:2004, Conducted transient
ISO 7637-3:1995, Conducted susceptibility on signal

ESD
ISO 10605:2001, ESD

Mechanical environment
IEC 60068-2-64:1993 Fh, Random vibration
IEC 60068-2-29:1987 Eb, Bump

Climate environment
IEC 60529:2001, Water
IEC 60068-2-30:1985 Db, Damp heat cyclic
IEC 60068-2-78:2001, Damp heat, steady state
IEC 60068-2-14:1984 Nb, Change of temperature

Chemical environment
IEC 60068-2-52:1996 Kb, Salt mist



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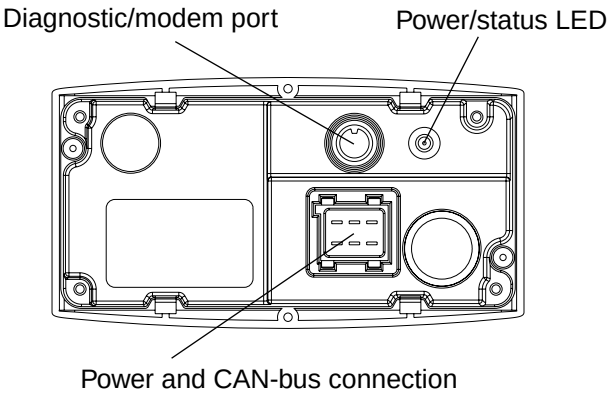

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IQAN-MD3 Display Modules

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Application

The IQAN-MD3 is a master unit that works with the expansion modules in the IQANdesign platform control system. The IQAN-MD3 is fully programmable for use in any machine application, as a graphical user interface and as a CAN gateway.

The IQAN-MD3 is constructed to be weatherproof for outdoor use. The unit will display vehicle data and system information.

Design and function

The IQAN-MD3 has a 3.5" transflective TFT color display. There are five navigation buttons and four 'soft' function buttons to make interaction with the control simple for the operator.

The unit is designed to be easily mounted in a vehicle dashboard or exterior control panel. The unit has two sealed and keyed Deutsch DTM 12 position connectors.

The 32-bit microprocessor in the IQAN-MD3 uses the same kernel as our other IQANdesign master units. This allows application function groups to be imported between unit types. Additionally, display screens from the IQAN-MDL are readily adapted to the IQAN-MD3. For time critical functions the sample rate can be set as low as 10 ms. The unit has a large internal memory for events and logging that is capable of storing 80,000 records.

The IQAN-MD3 analog inputs accept 0-5V signals from input devices or sensors. These inputs can also be set up as on-off inputs. A digital output is available and may be used for alarm or alert signals.

The IQAN-MD3 is connected to other units by two CAN buses. All CAN buses may be configured as ICP (IQAN CAN Protocol), SAE J1939 or Generic CAN. A third CAN bus may be used for diagnostics. The unit supports RS232 for modem (remote diagnostic) connection and USB for communication with a PC.

The IQAN-MD3 is made using selected components and conforms to strict international requirements.

Specifications

General

Weight	0.3 Kg
Temperature range	
Operating, ambient	-30 to 60°C (-25°C>LCD off >75°C)
Storage, ambient	-30 to 75°C
Protection	outdoor use
Voltage supply	9 - 32 Vdc
Current consumption (idle)	130 mA (28 Vdc) 190 mA (14 Vdc)

Performance

Processor	32-bit (144 MHz)
Logging	80K records
Sample time	min 10ms
Software tools	IQANdesign family

Communication interfaces

CAN (ISO 11898)	3[1]
Protocols	ICP, SAE J1939, CANopen, etc
RS-232	1
Protocols	AT-Hayes,GSM07.07, GSM07.05, IDP
USB 2.0 (full speed)	1

Outputs

Digital output	1
Type	high side switch
Max load	200 mA

Inputs

Voltage inputs	7
Signal range	0 - 5 Vdc
Resolution	1.2 mV
Digital inputs	(7)[2]
Signal high	>4 Vdc
Signal low	<=1 Vdc

1) The 3rd CAN bus is recommended to be used only for diagnostic purposes. Works with IQANdesign 2.0 or later software.

2) The voltage and digital inputs share the same physical pins. The user defines the channels/pins with IQANdesign.

Ordering part number

IQAN-MD3	20072409

Environmental Protection

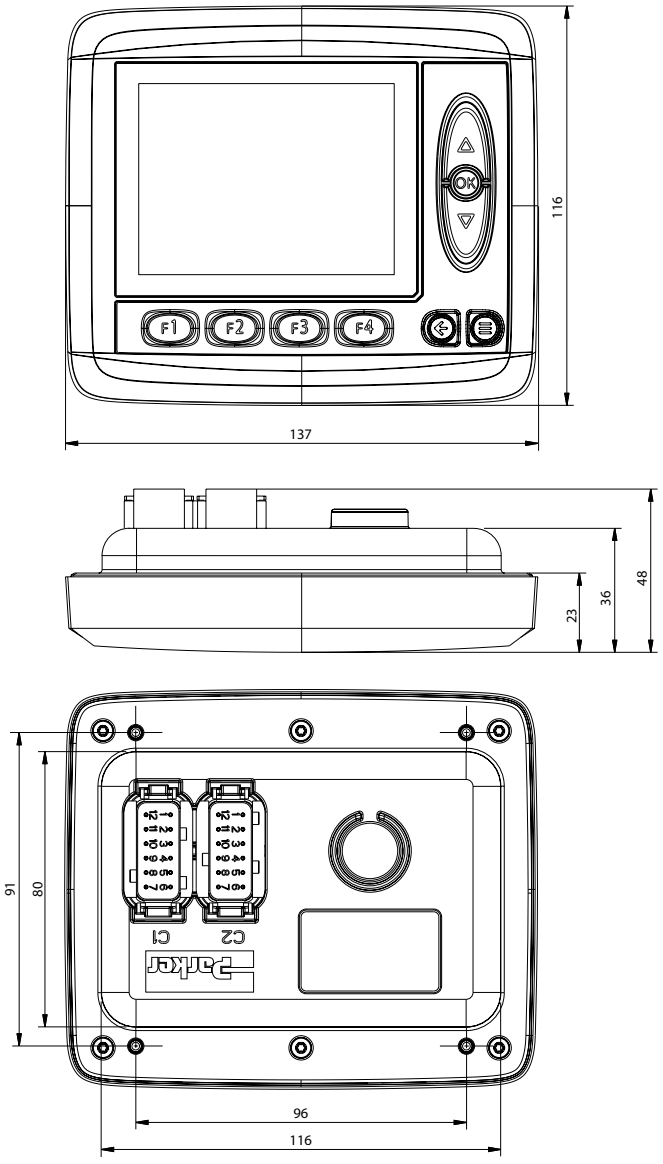
EMI
ISO 14982:1998 (radiated emission)
EN 55025:2003 (radiated emission)
ISO 11452-2:1995 (immunity vs EM field)
ISO 11452-4:2001 (immunity vs injected RF)
ISO 7637-2:1990 (immunity vs supply transients)
ISO 7637-3:1995 (immunity vs supply transients)

ESD
ISO 10605:2001 (handling)

Mechanical environment
IEC 60068-2-64:1993 Fh (random)
IEC 60068-2-29:1987 Eb (bump)

Climate environment
IEC 60529:2001 IP66 (water)
DIN 40050 Part 9:1993 IP6K9K
IEC 60068-2-30:1985 Db (var1, damp, cyclic)
IEC 60068-2-78:2001 (damp heat, steady state)
IEC 60068-2-2:1993-01 Bb (heat)
IEC 60068-2-1:1993-02 Ab (cold)
IEC 60068-2-14:1984 Nb (change of temperature)

Chemical environment
IEC 60068-2-52:1996 Kb (salt mist, cyclic)



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IQAN-MDL Display Modules

Electronic Control Systems

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Application

The IQAN-MDL is a new central unit that works with a variety of expansion modules in an IQAN control system. The MDL works as a master, displays information, provides a data gateway and has a variety of flexible I/O channels.

The IQAN-MDL is intended for the in-cab environment and will display vehicle data and system information. In most applications the display will replace all mechanical dial type instruments. The display has very high optical performance across a wide range of operating conditions.

Design and function

The IQAN-MDL has a 6.5” transflective TFT color display.

The unit has six on-off outputs that are high-side power outputs. The IQAN-MDL can also control proportional valves using either current mode (current closed-loop) or PWM mode (voltage open-loop) signals. The proportional outputs can control two bi-directional valve sections or two single solenoid devices (ie. proportional cartridge valves). Parameters are configured using IQAN software. These outputs may alternatively be used as digital inputs for switches.

The eight analog inputs accept 0-5V signals from input devices or sensors. These inputs can also be set up to accept one frequency or one directional frequency (quadrature) input.

The IQAN-MDL is connected to other units by four CAN buses. All CAN buses may be configured as ICP (IQAN CAN Protocol), SAE J1939 or Generic CAN. The unit has two RS232 ports for communication, a USB port and an embedded GSM triband modem.

The back of the unit has an SD memory slot for convenient data logging and a SIM card slot and antenna connection for the built-in GSM modem.

The IQAN-MDL is made using selected components and conforms to strict international requirements.

General

Weight	0.7 Kg
Temperature range	
Operating, ambient	-30 to +50 °C
Storage, ambient	-30 to +70 °C
Protection	in-cab use
Voltage supply	11- 32 Vdc
Current consumption (idle)	180 mA (28 Vdc) 170 mA (14 Vdc)
Data interface	
Type	Parker ICP (IQAN CAN Protocol) J1939, CANopen, etc.
Communication ports	
Type	RS232, USB
Modem	
Type	GSM triband (900/1800/1900 MHz)

Outputs

Proportional outputs	
Type current mode	current - closed-loop
PWM mode	voltage - open-loop
Signal range	100 - 2000 mA
Dither frequency	25 - 333 Hz
Resolution	1 mA
Digital outputs	
Type	high side switch
Max load	2 A

Inputs

Voltage inputs	
Signal range	0 - 5 Vdc
Resolution	5 mV
Frequency inputs	
Signal range (speed mode)	2 - 30000 Hz
(position mode)	0 - 30000 Hz
Quadrature inputs	
Signal range (speed mode)	2 - 30000 Hz
(position mode)	0 - 30000 Hz
Digital inputs	
DIN-A thru -D, DIN-M thru -P	
Signal high	>2 Vdc
Signal low	<0.8 Vdc
DIN-E thru -L	
Signal high	>3 Vdc
Signal low	<2.5 Vdc

Ordering part number

IQAN-MDL	20016753

Environmental Protection

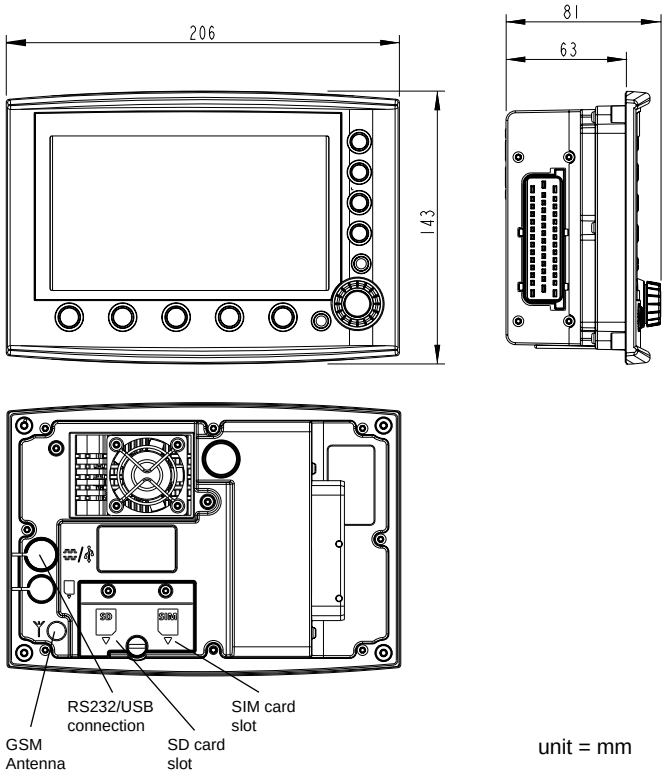
EMI
ISO 14982:1998 (radiated emission)
EN 55025:2003 (conducted emission)
ISO 11452-2:1995 (immunity vs EM field)
ISO 11452-4:2001 (immunity vs injected RF)
ISO 7637-2:1990 (immunity vs supply transients)
ISO 7637-3:1995 (immunity vs supply transients)
EN 61000-4-8:1993 (immunity vs magnetic field)

ESD
ISO 10605:2001 (handling)

Mechanical environment
IEC 68-2-64:1993 Fh (random)
IEC 68-2-29:1987 Eb (bump)

Climate environment
IEC 68-2-18:2000 Ra2 (water)
IEC 68-2-30:1985 Db (var1, damp, cyclic)
IEC 68-2-3:1969 Ca (damp, heat steady state)
IEC 68-2-2:1993-01 Bb (heat)
IEC 68-2-1:1993-02 Ab (cold)
IEC 68-2-14:1984 Nb (change of temperature)

Chemical environment
IEC 68-2-52:1996 Kb (salt mist, cyclic)



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IQAN-MDL2 Display Modules

Electronic Control Systems

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Application

The IQAN-MDL2 is a central unit that works with a variety of expansion modules in an IQAN control system. The IQAN-MDL2 works as a master, displays information, provides a data gateway and has a variety of flexible I/O channels.

The IQAN-MDL2 is intended for the in-cab environment and will display vehicle data and system information. In most applications the display will replace all mechanical dial type instruments.

The IQAN-MDL2 has multiple inputs and outputs for measurement and control of hydraulic systems. The different input types are voltage, on/off, directional frequency (quadrature) and frequency. The outputs are proportional and on/off. The unit also has 4 CAN interfaces, all of which are user configurable.

The IQAN-MDL2 has a large internal memory for events and logging that is power fail-safe protected.

Design and function

The IQAN-MDL2 has a 6.5” transflective TFT color display.

The IQAN-MDL2 has two (2) *proportional outputs* that can be configured as current mode (current closed-loop) or PWM mode (voltage open-loop) signals. These outputs can control two bi-directional valve sections or two single solenoid devices (ie. proportional cartridge valves). The parameters are configured using IQAN software. For flexibility these outputs may also be configured as up to two (2) *on-off outputs* and up to four (4) *on-off inputs*.

The unit also has six (6) *on-off outputs* that are high-side power outputs. The high-side outputs may not be configured as proportional.

The IQAN-MDL2 has eight (8) *voltage inputs* to accept 0-5V signals from input devices or sensors. These inputs can also be set up as *on-off inputs*. There are four (4) digital *on-off inputs* for switches. The digital inputs may be configured to accept one frequency or one directional frequency (quadrature) input.

The IQAN-MDL2 is connected to other units by four CAN buses. All CAN buses may be configured as ICP (IQAN CAN Protocol), SAE J1939 or Generic CAN (user defined). The unit supports RS232 for external modem, IQAN-GA connection and USB, RS232 or CAN for communication with a PC.

The IQAN-MDL2 is made using selected components and conforms to strict international requirements.

General

Weight	0.9 Kg
Temperature range	
Operating, ambient (no external loads, backlight off)	-30 to +70 °C
Storage, ambient	-40 to +80 °C
Protection	in-cab use
Voltage supply	11- 32 Vdc
Current consumption (idle, backlight on, outputs off)	320 mA (28 Vdc) 580 mA (14 Vdc)

Performance

Processor	32-bit (144 MHz)
Logging	16Mbyte flash
Sample time	Min 10 ms
Software tools	IQANdesign family

Outputs

Proportional outputs[1]	2 double
Type current mode	current - closed-loop
PWM mode	voltage - open-loop
Signal range	100 - 2000 mA
Dither frequency	25 - 333 Hz
Resolution	1 mA
Digital outputs	
Type	high side switch
Max load	2 A

Inputs

Voltage inputs[2]	8
Signal range	0 - 5 Vdc
Resolution	5 mV
Frequency inputs[3]	1
Signal range (speed mode)	2 - 30000 Hz
(position mode)	0 - 30000 Hz
Directional frequency inputs[3]	1
Signal range (speed mode)	2 - 30000 Hz
(position mode)	0 - 30000 Hz
Digital inputs	4 (16)
DIN-A thru -D[3], DIN-M thru -P[1]	
Signal high	>2 Vdc
Signal low	<0.8 Vdc
DIN-E thru -L[2]	
Signal high	>3 Vdc
Signal low	<2.5 Vdc

1) The proportional outputs and digital inputs share the same physical pins. The user defines the channels/pins with IQANdesign.

2) The voltage inputs and digital inputs share the same physical pins. The user defines the channels/pins with IQANdesign.

3) The frequency and digital inputs share the same physical pins. The user defines the channels/pins with IQANdesign.

Ordering part numbers

IQAN-MDL2	20075847

Communication interfaces

CAN (ISO 11898)	4
Protocols	ICP, SAE J1939, Generic (user defined)
RS-232	2 (1 each in C1 and C2 connectors)
Protocols	AT-Hayes,GSM07.07, GSM07.05, IDP
USB 2.0 (full speed)	1

Environmental Protection[1]

EMI
ISO 14982:1998, Radiated emission
EN 55025:2003, Conducted emission (CISPR 25)
ISO 11452-2:1998, Radiated Susceptilbility
ISO 11452-4:1998, Conducted Susceptibility
ISO 7637-2:2004, Transient susceptibility on power
ISO 7637-3:2007, Transient susceptibility on signal

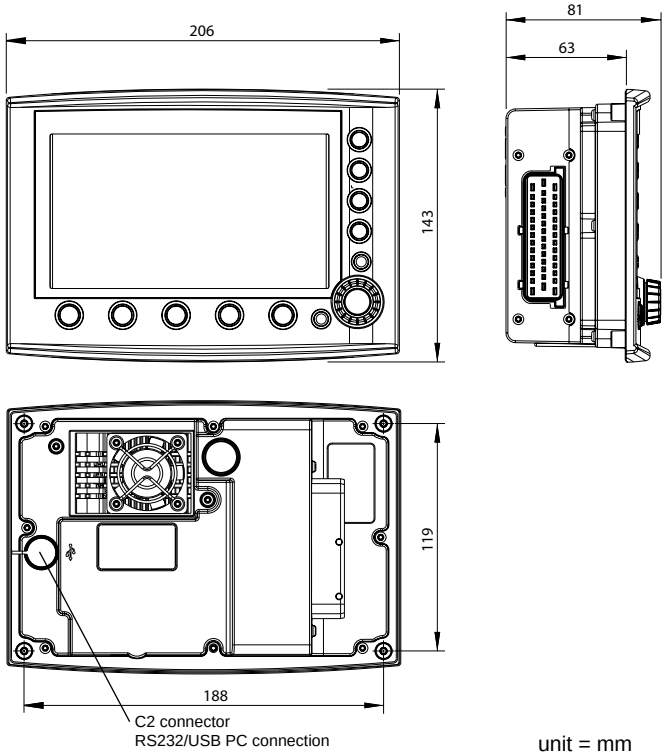
ESD
ISO 10605:2001, Handling

Mechanical environment
IEC 60068-2-64:1993 Fh, Random vibration
IEC 60068-2-29:1987 Eb, Bump

Climate environment
IEC 60529:2001, Enclosure protection (IPx3)
IEC 60068-2-1:1990 Ab, cold
IEC 60068-2-2:1974 Bb, heat
IEC 60068-2-30:1985 Db, Damp heat cyclic
IEC 60068-2-78:2001, Damp heat, steady state

Chemical environment
IEC 60068-2-52:1996 Kb (salt mist, cyclic)

1) Please refer to Instruction book HY17-8401-IB/UK for more information



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IQAN-TOC2 I/O Modules

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Application

The IQAN-TOC2 is a task oriented controller in the IQAN product group. The IQAN-TOC2 replaces valve driver modules and cards for a wide variety of proportional valves or other devices. This unit is designed for ease of setup, weather resistance, and safety.

The IQAN-TOC2 is a general purpose unit that can control two bi-directional valve sections or two cartridge solenoids simultaneously. The IQAN-TOC2 communicates with a variety of input and output devices. It has current mode (current closed-loop) or PWM mode (voltage open-loop) output for proportional valve control. The analog inputs accept signals from joysticks or potentiometers. Two digital inputs can be used to read switches.

Properties

Ease of setup

The IQAN-TOC2 has a simple mechanical interface for calibration. With a preloaded personality from the factory, setup can be easily performed on the machine using a screwdriver. Adjustments possible include threshold, maximum output and slopes. The IQAN-TOC2 may also be connected to a PC or Palm device and programmed using IQANdevelop software to change the functionality of the controller. This advanced feature allows the IQAN-TOC2 to be used in more demanding applications.

Weather resistance

The housing is designed to be rugged, but light and has a sealed, automotive AMP junior-power timer connector. The IQAN-TOC2 has a membrane to prevent condensation inside the housing. This controller is designed for the outdoor environment.

Safety

The IQAN-TOC2 is made using selected components and conforms to strict international requirements.

Diagnostics: If an error is detected an LED on the top of the controller flashes a sequence to indicate the nature of the error.

General

Weight	0.2 Kg
Operating temperature	-40 to +70 °C
Protection	outdoor use
Voltage supply	9 - 34 Vdc
Current consumption (idle)	60 mA (28 Vdc) 40 mA (14 Vdc)
Data interface	mechanical encoder or RS232 using IQANdevelop
VREF output (28V)	4.9 - 5.1Vdc, 30 mA

Outputs

Current / PWM outputs	
Number	2 double
Type current mode	current - closed loop
PWM mode	voltage - open loop
Min. threshold	50 mA
Max. load	3000 mA
Frequency range	25 - 333 Hz
Resolution	1 mA

Inputs

Voltage inputs	
Number	2
Signal range	0 - 5 Vdc
Resolution	5 mV
Digital inputs	
Number	2
Signal high	4Vdc - V_{BAT}
Signal low	0 - 1Vdc

Ordering part number

IQAN-TOC2	5010028

Environmental Protection

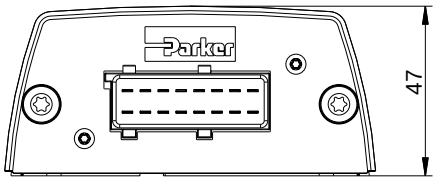
EMI
ISO 11452-2 (immunity vs EM field)
ISO 14982 (radiated emission)
ISO 11452-4 (immunity vs injected RF)
ISO 7637-2,-3 (immunity vs supply transients)

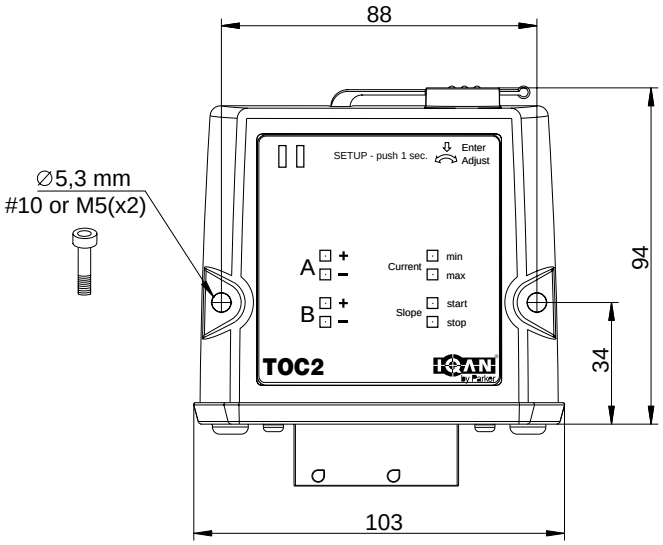
ESD
EN 61000-4-2 (external)

Mechanical environment
IEC 68-2-64 Fh (random)
IEC 68-2-29 Eb (bump)

Climate environment
IEC 68-2-18 Rb2 (water)
IEC 68-2-30 Db (var1, damp, cyclic)
IEC 68-2-3 Ca (damp, heat steady state)
IEC 68-2-2 Bb (heat)
IEC 68-2-1 Ab (cold)
IEC 68-2-14 Nb (change of temperature)

Chemical environment
IEC 68-2-52 Kb (salt mist, cyclic)





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IQAN-TOC8 I/O Modules

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Application

IQAN-TOC8 is from the same family as the ”rugged” generation of expansion modules in the IQAN product group. These modules focus on flexibility, weather resistance and safety.

IQAN-TOC8 is a general purpose controller and communicates with a variety of input and output devices. It connects to a laptop PC and is programmed with IQANdevelop software. No Master module is required. It has proportional current outputs for valve control, digital/PWM outputs for auxiliary functions and analog/digital inputs for signals like pressure, RPM or temperature. The unit has a CAN hub designed to interface with a SAE J1939 network.

Properties

Flexibility

The IQAN-TOC8 has a flexible I/O interface. The same physical pin can be used for different types of I/O. Various types of I/O such as digital and PWM outputs increase the flexibility of the controller. The digital outputs have useful features such as softstart and peak & hold.

Weather resistance

The aluminum housing is designed to be rugged, but light. The IQAN-TOC8 has a membrane to prevent condensation inside the housing. This control is designed for the outdoor environment.

Safety

The unit executes a self-test during start up and cyclic operation. An internal watch dog checks for software errors and will interrupt outputs if errors are detected. Error conditions are displayed by coded flashes of the status LED.All inputs are protected against EMI and voltage transients. Automotive connectors are used that fulfill mobile equipment mechanical and electrical demands.

General

Weight	0.7 Kg
Operating temperature	-40 to +70 °C
Protection	outdoor use
Voltage supply	9 - 34 Vdc
Current consumption (idle)	180 mA (28 Vdc) 170 mA (14 Vdc)
Data interface	RS232 using IQANdevelop
CAN hub	J1939 or other byte-aligned CAN protocol

Outputs

Proportional current outputs	
Number	2 double
Signal range	60 - 1800 mA
Dither frequency	25 - 150 Hz
Dither amplitude	0 - 500 mA
Resolution	0.7 mA
Digital/ PWM (no current feedback) outputs [1]	
Number	6 / 3 double PWM
Type	high side switch
Max load	3 A
PWM frequency	25 - 2000 Hz

Inputs

Voltage/ Frequency inputs [2]	
Number	10 / 4
Signal range	0 - 5 Vdc
Resolution	5 mV
Frequency range	2-10000 Hz

1) *The Digital and PWM outputs share the same physical pins. By configuring the channels with IQANdevelop , the user defines the pins as (6) Digital outputs or as (3) double PWM outputs.*

2) *The voltage and frequency inputs share the same physical pins. By configuring the channels with IQANdevelop, the user defines the pins as voltage in or frequency.*

Ordering part number

IQAN-TOC8	5010024

Environmental Protection

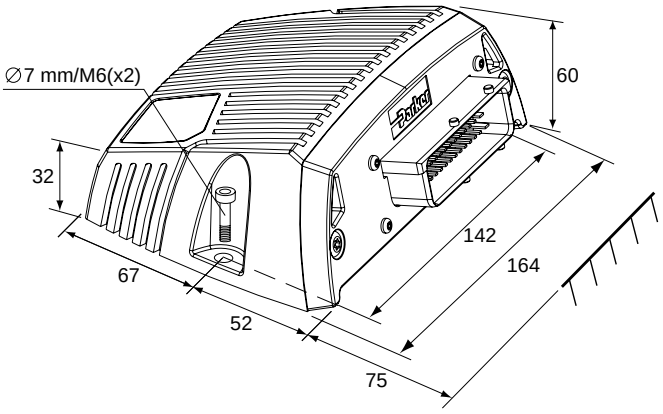
EMI
ISO 11452-2 (immunity vs EM field)
ISO 14982 (radiated emission)
ISO 11452-4 (immunity vs injected RF)
ISO 7637-2 (immunity vs supply transients)

ESD
EN 61000-4-2 (external)

Mechanical environment
IEC 68-2-64 Fh (random, 10- 250 Hz)
IEC 68-2-27 Es (shock, 11ms)
IEC 68-2-29 Eb (bump, 6ms)

Climate environment
IEC 68-2-18 Rb3 (water)
IEC 68-2-30 Db (var1, damp, cyclic)
IEC 68-2-3 Ca (damp, heat steady state)
IEC 68-2-2 Bb (heat)
IEC 68-2-1 Ab (cold)
IEC 68-2-14 Nb (change of temperature)

Chemical environment
IEC 68-2-52 Kb (salt mist, cyclic)



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IQAN-MC2 I/O Modules

Electronic Control Systems

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Application

The IQAN-MC2 is a flexible master unit for the IQAN bus system. This unit is suitable for use as either a Bus master or standalone control. The IQAN-MC2 has new I/O and system flexibility that allows the user greater freedom in defining signals and system layout for both measurement and control.

The 32 bit architecture of the IQAN-MC2 provides computational capacity that allows it to perform high speed (ex. 5 ms) control loops for time critical functions. The unit is equipped with a Real Time Clock and can perform data logging functions.

Inputs

The IQAN-MC2 controller has 5 voltage inputs for connection of 0-5 Vdc signals. The inputs are multi-purpose and for flexibility may be configured in other ways. All five input pins can be configured as on-off inputs for switches or as frequency inputs for measuring frequency.

Voltage inputs, on-off inputs and frequency inputs share pin positions.

Another flexible option available allows the proportional output return pins to be configured as up to eight voltage inputs or on-off inputs. The proportional output return pins, voltage inputs and on-off inputs share pin positions.

Proportional outputs

The MC2 unit has eight double proportional outputs for controlling valves. These outputs can control eight bi-directional proportional valve sections or eight single solenoid devices (ie. proportional cartridge valves).

The proportional outputs can be used in two different modes. Either Current mode (current closed-loop) or PWM mode (voltage open-loop) signals can be selected and the parameters configured using IQAN software.

For flexibility these outputs may also be configured as up to eight high-side, on-off outputs. When used in this manner the proportional output return pins can be configured as up to sixteen low-side, on-off outputs, for a maximum of 24 on-off outputs. A bank of low-side, on-off outputs is typically connected to one or more high-side, on-off outputs and are used for low current functions.

Weather resistance

The aluminum housing is designed to be rugged, but light and has a sealed, automotive AMP/Tyco power timer connector. The IQAN-MC2 has a membrane to prevent condensation inside the housing. Additional protection allows the unit to be steam-cleaned. This controller is designed for the outdoor environment.

General

Weight	0.7 Kg
Temperature range	
Operating, ambient	-40 to +70 °C
Storage, ambient	-40 to +85 °C
Protection	outdoor use
Voltage supply	11- 32 Vdc
Current consumption (idle)	160 mA (28 Vdc) 200 mA (14 Vdc)
Data interface	
Type	Parker ICP (IQAN CAN Protocol) J1939, Generic CAN
Communication port	
Type	USB 1.1

Outputs

Proportional outputs	
Type current mode	current - closed-loop
PWM mode	voltage - open-loop
Signal range	100 - 2000 mA
Dither frequency	25 - 333 Hz
Resolution	1 mA
Digital outputs	
Type	high side switch
Max load	2000 mA

Inputs

Voltage inputs	
Signal range	0 - 5 Vdc
Resolution	5 mV
Frequency inputs	
Signal range (speed mode)	2 - 20000 Hz
(position mode)	0 - 20000 Hz
Digital inputs	
Signal high	4 Vdc - V_{BAT}
Signal low	0 - 1 Vdc

Ordering part number

IQAN-MC2	20070899

Environmental Protection

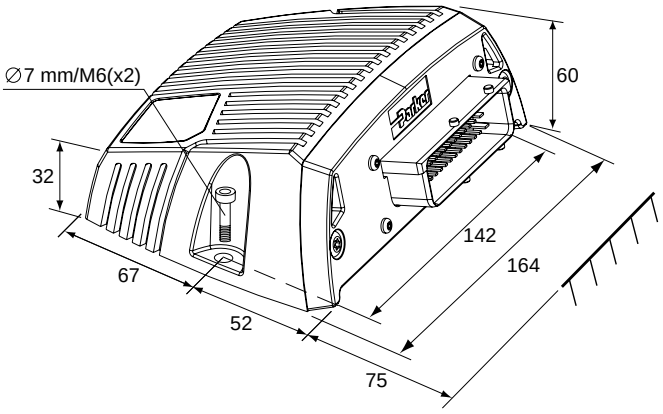
EMI
ISO 11452-2:1995 (immunity vs EM field)
ISO 14982:1998 (radiated emission)
ISO 11452-4:2001 (immunity vs injected RF)
ISO 7637-2:1990 (immunity vs supply transients)
ISO 7637-3:1995 (immunity vs supply transients)

ESD
ISO 10605:2001 (external)

Mechanical environment
IEC 60068-2-64:1993 Fh (random)
IEC 60068-2-29:1987 Eb (bump)

Climate environment
IEC 60529:2001 IP66 (dust, water)
DIN 40050 Part 9:1993 IP6K9K (steam jet cleaning)
IEC 60068-2-30:1985 Db (var1, damp, cyclic)
IEC 60068-2-78:2001 (damp, heat steady state)
IEC 60068-2-2:1993-01 Bb (heat)
IEC 60068-2-1:1993-02 Ab (cold)
IEC 60068-2-14:1984 Nb (change of temperature)

Chemical environment
IEC 60068-2-52:1996 Kb (salt mist, cyclic)



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IQAN-XP2 I/O Modules

Electronic Control Systems

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Application

IQAN-XP2 is one of the “rugged generation” IQAN expansion modules. Key improvements for this generation of modules are flexibility, weather resistance and safety.

All IQAN expansion modules communicate with a master over a CAN-BUS serial link. Mobile machine I/O (inputs and outputs) can be optimised by selecting the appropriate expansion modules from the IQAN product family.

Properties

Flexibility

The IQAN-XP2 module has a flexible I/O interface which gives system designers increased options. The same physical pin can be used for different types of I/O.

Additional types of I/O such as PWM outputs increase the flexibility of the module. Digital outputs have features including softstart and peak & hold.

Weather resistance

The enclosure is designed and manufactured in aluminum to make the module rugged but light. The module has a membrane to prevent condensation from forming inside the enclosure. The IQAN-XP2 unit is designed for a wide temperature range in an outdoor environment.

Safety

The IQAN-XP2 executes a self-test during start up and cyclic operation. Detected errors are sent to the master. An internal watch dog checks for software errors and will interrupt outputs if errors are detected. All inputs are protected against EMI and voltage transients. Automotive connectors are used that fulfil mechanical and electrical demands.

System diagnostics: If an error is detected a LED on the rear of the module flashes a sequence to indicate the nature of the error.

General

Weight	0.7 Kg
Operating temperature	-40 - +70 °C
Protection	outdoor use
Voltage supply	9 - 34 Vdc
Current consumption (idle)	180 mA (28 Vdc) 170 mA (14 Vdc)
Data interface	Parker ICP (IQAN CAN Protocol)

Outputs

Proportional current outputs

Number	4 double
Signal range	60 - 1800 mA
Dither frequency	25 - 150 Hz
Dither amplitude	0 - 500 mA
Resolution	0.7 mA

Digital/ PWM (no current feedback) outputs [1)]

Number	4 / 2 double
Type	high side switch
Max load	3 A
PWM frequency	25 - 2000 Hz

Inputs

Voltage/Frequency [2)]

Number	4 / 2
Signal range	0 - 5 Vdc
Resolution	5 mV
Frequency range	1-10 000 Hz

1) The Digital and PWM outputs share the same physical pin. Pin configuration for either Digital or PWM output is carried out with IQANdevelop.

2) The voltage and frequency inputs share the same physical pins. Pin configuration for either Voltage or Frequency input is carried out with IQANdevelop.

Ordering part number

IQAN-XP2	5010016

Environmental protection

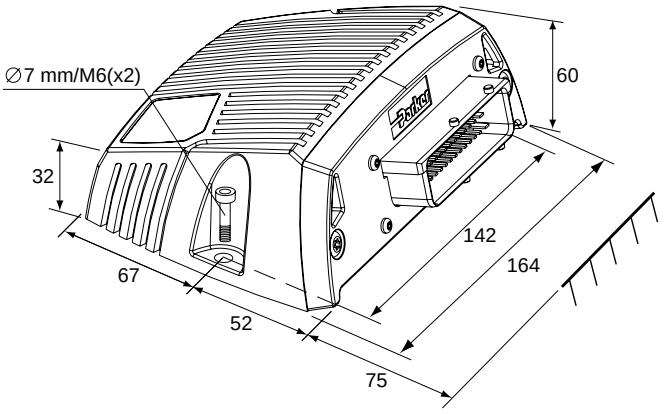
EMI
EN 61000-4-3, Conducted susceptability
EN 50204-4-3, Radiated susceptability

ESD
EN 61000-4-2, handling

Mechanical environment
IEC 60068-2-64:1993 Fh, Random vibration
IEC 60068-2-29:1987 Eb, Bump

Climate environment
IEC 60529:2001, IP66 Enclosure protection
DIN 40050 Part 9:1993, IP6K9K Enclosure protection
IEC 60068-2-30:1985 Db, Damp heat cyclic
IEC 60068-2-78:2001, Damp heat, steady state
IEC 60068-2-14:1984 Nb, Change of temperature

Chemical environment
IEC 60068-2-52:1996 Kb, Salt mist



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IQAN-XT2 I/O Modules

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Application

IQAN-XT2 is one of the “rugged generation” IQAN expansion modules. Key improvements for this generation of modules are flexibility, weather resistance and safety.

All IQAN expansion modules communicate with a master over a CAN-BUS serial link. The IQAN-XT2 has an additional CAN hub designed to interface with J1939 diesel engines on mobile machinery and has a dedicated output for electronic throttle control.

Properties

Flexibility

The IQAN-XT2 module has a flexible I/O interface which gives system designers increased options. The same physical pin can be used for different types of inputs or outputs. New types of I/O such as E-gas and PWM outputs increase the flexibility of the module. Digital outputs now have features such as softstart and peak & hold. The J1939 CAN hub allows the IQAN-XT2 to communicate directly with an electronic engine control bus.

Weather resistance

The enclosure is aluminum to make the module rugged but light. The module has a membrane to prevent condensation from forming inside the enclosure. The IQAN-XT2 is designed for a wide temperature range in an outdoor environment.

Safety

The IQAN-XT2 executes a self-test during start up and cyclic operation. Detected errors are sent to the master. An internal watch dog checks for software errors and will interrupt outputs if errors are detected. All inputs are protected against EMI and voltage transients. Automotive connectors are used that fulfil mechanical and electrical demands.

System diagnostics: If an error is detected a LED on the rear of the module flashes in sequence to indicate the nature of the error.

General

Weight	0.7 Kg
Operating temperature	-40 - +70 °C
Protection	outdoor use
Voltage supply	9 - 34 Vdc
Current consumption (idle)	180 mA (28 Vdc) 170 mA (14 Vdc)
Data interface	Parker ICP (IQAN CAN Protocol)
Additional CAN hub	J1939 or other byte-aligned CAN protocol

Outputs

Proportional current outputs

Number	2 double
Signal range	60 - 1800 mA
Dither frequency	25 - 150 Hz
Dither amplitude	0 - 500 mA
Resolution	0.7 mA

Digital/ PWM (no current feedback) outputs [1)]

Number	6 / 3 double
Type	high side switch
Max load	3 A
PWM frequency	25 - 2000 Hz

E-gas/Servo motor output (PWM H-bridge)

Number	1
Signal Range	0-100% rated power
Max load	2,5A

Inputs

Voltage/Frequency [2)]

Number	10/3
Signal range	0 - 5 Vdc
Resolution	5 mV
Frequency range	1-10 000 Hz

1) The Digital and PWM outputs share the same physical pin. Pin configuration for either Digital or PWM output is carried out with IQANdevelop.

2) The voltage and frequency inputs share the same physical pins. Pin configuration for either Voltage or Frequency input is carried out with IQANdevelop.

Ordering part number

IQAN-XT2	5010018

Environmental protection

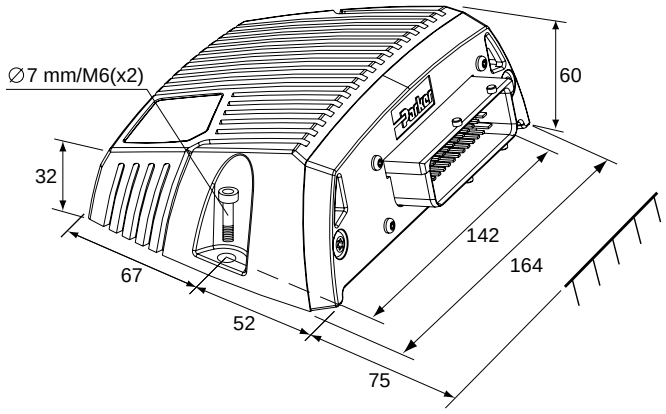
EMI
ISO 14982:1998, Radiated emission
EN 55025:2003, Conducted emission
ISO 11452-2:1995, Radiated susceptibility
ISO 11452-4:2001, Conducted susceptibility
ISO 7637-2:2004, Conducted transient on power
ISO 7637-3:1995, Conducted transient on signal
EN 61000-4-8:1993, Magnetic field

ESD
ISO 10605:2001, ESD

Mechanical environment
IEC 60068-2-64:1993 Fh, Random vibration
IEC 60068-2-29:1987 Eb, Bump

Climate environment
IEC 60529:2001, IP66 (dust, water)
DIN 40050 Part 9:1993, IP6K9K (steam jet cleaning)
IEC 60068-2-30:1985 Db, Damp heat cyclic
IEC 60068-2-78:2001, Damp heat, steady state
IEC 60068-2-14:1984 Nb, Change of temperature

Chemical environment
IEC 60068-2-52:1996 Kb, Salt mist



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IQAN-XA2
I/O Modules

Electronic Control Systems

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Application

The IQAN-XA2 is an IQANdesign platform expansion module in the IQAN product group. This unit is designed for high digital I/O count, weather resistance, and safety.

All IQAN expansion modules communicate with a master over a CAN bus. The IQAN-XA2 module has increased I/O flexibility that allows the user greater freedom in defining signals for measurement and control.

I/O flexibility

Inputs

The IQAN-XA2 module has eight voltage inputs for connection of 0-5 Vdc signals. Four of the inputs are multi-purpose and for flexibility may be configured as frequency inputs or as directional frequency (quadrature) inputs for measuring speed and position.

Outputs

The XA2 module has six on-off outputs that are high-side power outputs.

The XA2 module also has six double proportional outputs for controlling proportional valves. These outputs can control six bi-directional valve sections or six single solenoid devices (ie. proportional cartridge valves). The proportional outputs can be used in two different modes. Either Current mode (current closed-loop) or PWM mode (voltage open-loop) signals can be selected and the parameters configured using IQAN software.

For flexibility these outputs may also be configured as up to six on/off outputs and up to twelve on/off inputs. The proportional outputs, on-off outputs and on-off inputs share pin positions.

Weather resistance

The aluminum housing is designed to be rugged, but light and has a sealed, automotive AMP/Tyco power timer connector. The IQAN-XA2 has a membrane to prevent condensation inside the housing. This controller is designed for the outdoor environment.

Safety

The unit executes a self-test during start up and cyclic operation. An internal watch dog checks for software errors and will interrupt outputs if errors are detected. The IQAN-XA2 is made using selected components and conforms to strict international requirements. Diagnostics: If an error is detected an LED on the top of the controller flashes a sequence to indicate the nature of the error.

General

Weight	0.7 Kg
Temperature range	
Operating, ambient	-40 to +70 °C
Storage, ambient	-40 to +85 °C
Protection	outdoor use
Voltage supply	11- 32 Vdc
Current consumption (idle)	180 mA (28 Vdc) 170 mA (14 Vdc)
Data interface	Parker ICP (IQAN CAN Protocol)

Outputs

Proportional outputs	
Type current mode	current - closed-loop
PWM mode	voltage - open-loop
Signal range	100 - 2000 mA
Dither frequency	25 - 333 Hz
Resolution	1 mA
Digital outputs	
Type	high side switch
Max load	2 A

Inputs

Voltage inputs	
Signal range	0 - 5 Vdc
Resolution	5 mV
Frequency inputs	
Signal range (speed mode)	2 - 30000 Hz
(position mode)	0 - 30000 Hz
Quadrature inputs	
Signal range (speed mode)	2 - 30000 Hz
(position mode)	0 - 30000 Hz
Digital inputs	
Signal high	4 Vdc - V_{BAT}
Signal low	0 - 1 Vdc

Ordering part number

IQAN-XA2	5010033

Environmental protection

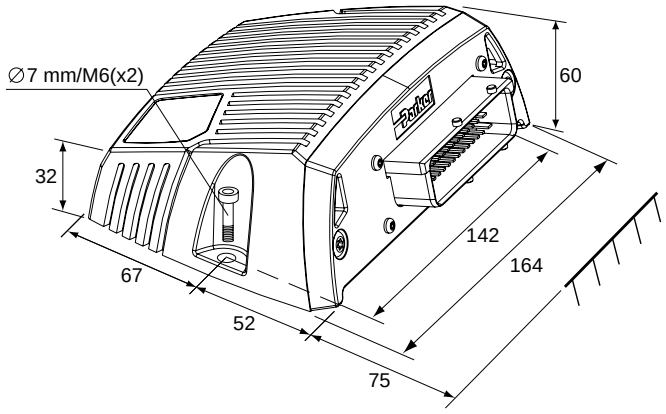
EMI
ISO 14982:1998, Radiated emission
EN 55025:2003, Conducted emission
ISO 11452-2:1995, Radiated susceptibility
ISO 11452-4:2001, Conducted susceptibility
ISO 7637-2:2004, Conducted transient on power
ISO 7637-3:1995, Conducted transient on signal
EN 61000-4-8:1993, Magnetic field

ESD
ISO 10605:2001, ESD

Mechanical environment
IEC 60068-2-64:1993 Fh, Random vibration
IEC 60068-2-29:1987 Eb, Bump

Climate environment
IEC 60529:2001, IP66 (dust, water)
DIN 40050 Part 9:1993, IP6K9K (steam jet cleaning)
IEC 60068-2-30:1985 Db, Damp heat cyclic
IEC 60068-2-78:2001, Damp heat, steady state
IEC 60068-2-14:1984 Nb, Change of temperature

Chemical environment
IEC 60068-2-52:1996 Kb, Salt mist



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IQAN-XS2
I/O Modules

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Application

The IQAN-XS2 is an IQANdesign platform expansion module in the IQAN product group. This unit is designed for high digital I/O count, weather resistance, and safety.

All IQAN expansion modules communicate with a master over a CAN bus. The IQAN-XS2 module has a large number of inputs and outputs that allows the user to have fewer modules for digital signals.

I/O

Inputs

The IQAN-XS2 module has eight voltage inputs for connection of 0-5 Vdc signals. The inputs are multi-purpose and for flexibility may be configured as digital (on-off) inputs.

The unit also has twelve dedicated digital inputs for accepting signals from a variety of switches.

Digital outputs

The IQAN-XS2 module has twelve on-off outputs for controlling on-off ”bang-bang” valves. These outputs can control six valve sections or twelve single solenoid devices (ie. cartridge valves).

Weather resistance

The aluminum housing is designed to be rugged, but light and has a sealed, automotive AMP/Tyco power timer connector. The IQAN-XS2 has a membrane to prevent condensation inside the housing. This controller is designed for the outdoor environment.

Safety

The unit executes a self-test during start up and cyclic operation. An internal watch dog checks for software errors and will interrupt outputs if errors are detected. The IQAN-XS2 is made using selected components and conforms to strict international requirements.

Diagnostics: If an error is detected an LED on the top of the controller flashes a sequence to indicate the nature of the error.

General

Weight	0.7 Kg
Temperature range	
Operating, ambient	-40 to +70 °C
Storage, ambient	-40 to +85 °C
Protection	outdoor use
Voltage supply	11- 32 Vdc
Current consumption (idle)	180 mA (28 Vdc) 170 mA (14 Vdc)
Data interface	Parker ICP (IQAN CAN Protocol)

Outputs

Digital outputs	
Type	high side switch
Max load	2 A

Inputs

Voltage inputs	
Signal range	0 - 5 Vdc
Resolution	5 mV
Digital inputs	
Signal high	4 Vdc - V_{BAT}
Signal low	0 - 1 Vdc

Ordering part number

IQAN-XS2	5010017

Environmental protection

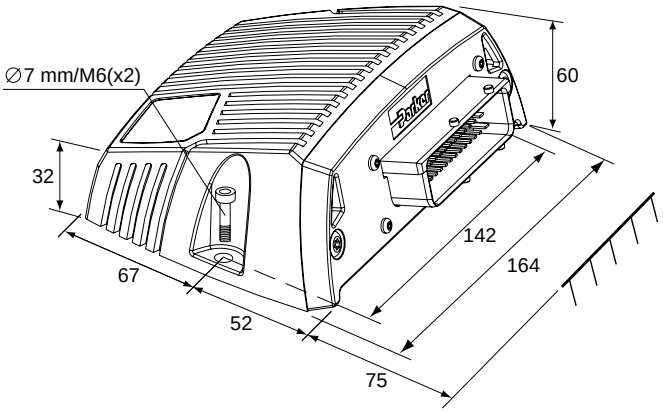
EMI
ISO 14982:1998, Radiated emission
EN 55025:2003, Conducted emission
ISO 11452-2:1995, Radiated susceptibility
ISO 11452-4:2001, Conducted susceptibility
ISO 7637-2:2004, Conducted transient on power
ISO 7637-3:1995, Conducted transient on signal
EN 61000-4-8:1993, Magnetic field

ESD
ISO 10605:2001, ESD

Mechanical environment
IEC 60068-2-64:1993 Fh, Random vibration
IEC 60068-2-29:1987 Eb, Bump

Climate environment
IEC 60529:2001, IP66 (dust, water)
DIN 40050 Part 9:1993, IP6K9K (steam jet cleaning)
IEC 60068-2-30:1985 Db, Damp heat cyclic
IEC 60068-2-78:2001, Damp heat, steady state
IEC 60068-2-14:1984 Nb, Change of temperature

Chemical environment
IEC 60068-2-52:1996 Kb, Salt mist



unit=mm

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IQAN-G1
I/O Modules

Electronic Control Systems

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Application

The IQAN-G1 is a remote diagnostic module in the IQAN product group. The IQAN-G1 is a wireless, quad-band, GSM modem suitable for use globally where GSM cellular service is available[1].

The IQAN-G1 is a GSM modem unit that works with the MDL2, MD3, MDM and TOC8 master modules in IQANdesign and IQANdevelop control systems. The IQAN-G1 is constructed to be weatherproof for outdoor use. The unit communicates with a set of predefined AT commands via RS232 connection to the master module.

Design and function

The IQAN-G1 has an embedded GSM modem supporting GSM 850/900/1800/1900 bands.

The unit is designed to be easily mounted in a vehicle dashboard or on an exterior panel. The unit has one sealed and keyed Deutsch DTM connector. This modem is designed for the outdoor environment.

The IQAN-G1 is made using selected components and conforms to strict international requirements.

General

Weight	0.2 Kg
Temperature range	
Operating, ambient[2]	-40 to +85 °C
Storage, ambient	-40 to +90 °C
Protection	outdoor use
Voltage supply	9- 32 Vdc
Current consumption (transmit)	40 mA (28 Vdc) 60 mA (14 Vdc)
Current consumption (idle)	1 mA (28 Vdc) 2 mA (14 Vdc)

Performance

Protocols	GSM quad-band (850/ 900/1800/1900 MHz)

Communication interfaces

Protocols	Serial (RS-232)

Connector interfaces

Power/RS-232	Deutsch DTM
Antenna	FAKRA Bordeaux

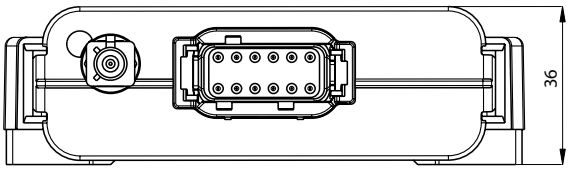
Ordering part number

IQAN-G1	20075848

1 *Wireless service providers must also offer two-way Circuit Switched Data (CSD) services for transferring data. The IQAN-G1 will not be suitable for use in any region where the GSM service providers do not offer CSD.*

2 *The operating temperature for the manufacturer's SIM card may differ from the IQAN-G1 ratings. Consult the service provider to determine the temperature rating for the SIM card.*

Environmental Protection



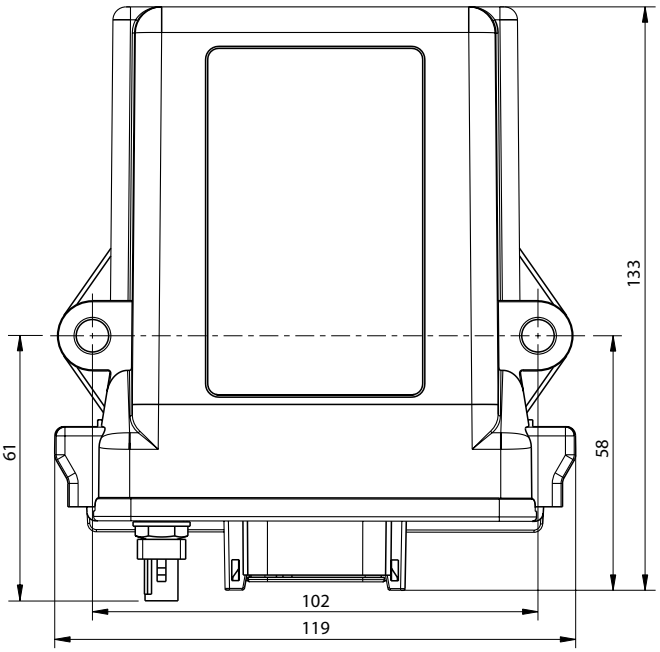
EMI
ISO 14982: 1998 (radiated emission)
EN 55025: 2003 (radiated emission)
ISO 11452-2: 1995 (immunity vs EM field)
ISO 11452-4: 2001 (immunity vs injected RF)
ISO 7637-2: 1990 (immunity vs supply transients)
ISO 7637-3: 1995 (immunity vs supply transients)

ESD
ISO 10605: 2001 (handling)

Mechanical environment
IEC 60068-2-64: 1993 Fh (random)
IEC 60068-2-9: 1987 Eb (bump)

Climate environment
IEC 60529: 2001 IP66 (water)
DIN 40050 Part 9: 1993 IP6K9K
IEC 60068-2-30: 1985 Db (var1, damp, cyclic)
IEC 60068-2-78: 2001 (damp heat, steady state)
IEC 60068-2-2: 1993-01 Bb (heat)
IEC 60068-2-1: 1993-0 Ab (cold)
IEC 60068-2-14: 1984 Nb (change of temperature)

Chemical environment
IEC 60068-2-52: 1996 Kb (salt mist, cyclic)



unit = mm

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IQAN-LSL Input Devices

Electronic Control Systems

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Application

The IQAN-LSL is a new lever in the IQAN product group. This lever focuses on compact design, weather resistance and safety.

The LSL is a single-axis joystick, 0.5 - 4.5 Vdc, intended for the proportional control of one double-acting hydraulic function. The lever has several options including a manual neutral detent and a switch in the top of the handle. For 24V systems there are solenoid detent options at full stroke in either the B (minus) direction or both A (plus) and B (minus) directions. A solenoid detent at 75% in the B (minus) direction is also available. The LSL can be mounted in the armrest or on the dashboard in mobile vehicles. It has a comfortable grip and is easily actuated for good ergonomics.

Design and function

The IQAN-LSL is lightweight with small installation dimensions. The ergonomic design gives a good support to the arms and wrists and assures a comfortable grip from several angles. Mounting screws are installed from underneath for a clean appearance of dashboard, panel or armrest.

The IQAN-LSL has an IP65 rating above the flange and the cable has a choice of either a Saab sealed AMP junior-power timer connector or a Deutsch DT series transportation connector. This unit is designed for the outdoor environment.

The IQAN-LSL is a spring centered, dual sensor device. The optional switch in the top of the handle can be used to detect operator presence. The dual sensors provide 0.5 - 4.5 Vdc and 4.5 - 0.5 Vdc outputs which allows error checking to meet high safety requirements. All inputs and outputs are protected against short circuit to ground. The LSL is well suited as a control unit for a variety of valve drivers. The LSL fits to the IQAN platform and is designed to meet typical environmental stresses in mobile hydraulic applications.

General

Weight	0.22 Kg
Rated power supply (V_S)	5 Vdc
Load resistive (min.)	1K Ω
Load capacitive (max.)	1 µF
Current consumption	16 mA

Mechanical

Angle of movement	±20°
Expected life (operations)	5 million

Environment

Operating temperature	-40° to 70 °C
Sealing above the flange	IP65
Sealing with DN option	IP44

Analog outputs

Active range (VDC out)	10%-90% V_S
Resolution	<2mV

Digital output option

Handle switch, top	V_{BAT} (+12V, +24V)
Max load current, DOUT	200 mA

Other options

Mechanical detent	Neutral only
Solenoid detents	V_{BAT} (+24V only)

Connectors

S	Saab (AMP/Tyco JPT)
D	Deutsch DT04

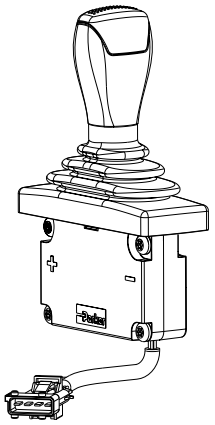
Ordering part numbers

IQAN-LSL-E0-//-//-S	20011365
IQAN-LSL-E0-DN-//-S	20011366
IQAN-LSL-E0-//-L1-S	20011367
IQAN-LSL-E0-//-L2-S	20011368
IQAN-LSL-E0-//-L3-S	20011369
IQAN-LSL-E1-//-//-S	20011370
IQAN-LSL-E1-DN-//-S	20011371
IQAN-LSL-E1-//-L1-S	20011372
IQAN-LSL-E1-//-L2-S	20011373
IQAN-LSL-E1-//-L3-S	20011374
IQAN-LSL-E0-//-//-D	20014069

Descriptions

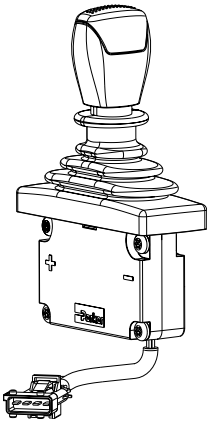
IQAN - LSL - E0 - / / - / /

The basic version of the LSL has a single cable with a sealed 4 position connector. The range for Output A is 0.5 to 4.5Vdc and the range for Output B is 4.5 to 0.5Vdc.



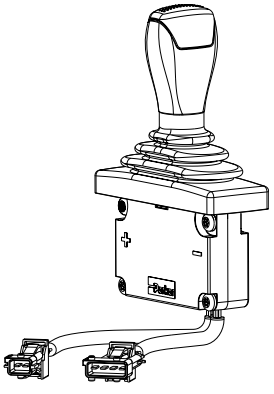
IQAN - LSL - E0 - DN - / /

This version of the LSL has a single cable with a sealed 4 position connector. The range for Output A is 0.5 to 4.5Vdc and the range for Output B is 4.5 to 0.5Vdc. There is a spring loaded manual detent that must be disengaged to move the handle away from the center (neutral) position.



IQAN - LSL - E0 - / / - Lx

This version of the LSL has two cables. The main cable has a sealed 4 position connector. The second cable is for the solenoid detent option and has a 2 position connector. The range for Output A is 0.5 to 4.5Vdc and the range for Output B is 4.5 to 0.5Vdc. The solenoid supply is from V_{BAT}.



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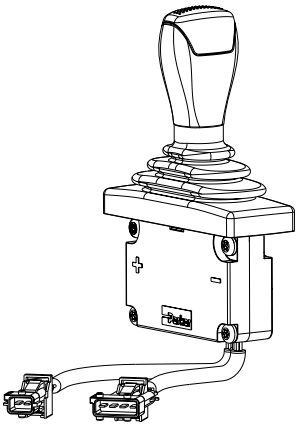
Mobile Controls Division Europe
Borås, Sweden

Descriptions

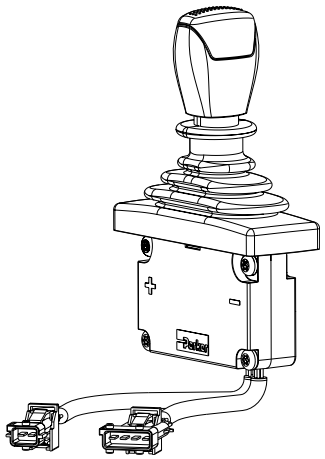
IQAN - LSL - E1 - / / - / /

This version of the LSL has two cables. The main cable has a sealed 4 position connector. The second cable is for the switch and has a 2 position connector. The range for Output A is 0.5 to 4.5Vdc and the range for Output B is 4.5 to 0.5Vdc. The switch supply is from V_{BAT}.



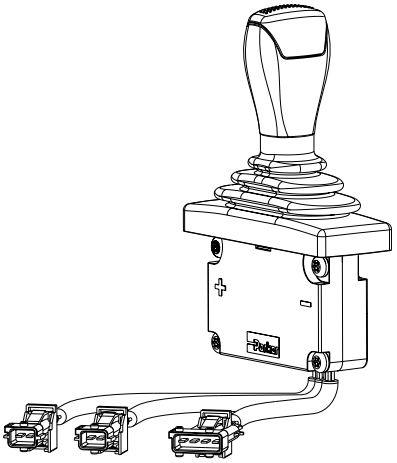
IQAN - LSL - E1 - DN - / /

This version of the LSL has two cables. The main cable has a sealed 4 position connector. The second cable is for the switch and has a 2 position connector. The range for Output A is 0.5 to 4.5Vdc and the range for Output B is 4.5 to 0.5Vdc. There is a spring loaded manual detent that must be disengaged to move the handle away from the center (neutral) position.



IQAN - LSL - E1 - / / - Lx

This version of the LSL has three cables. The main cable has a sealed 4 position connector. The other two cables are for the switch and solenoid detent options and each has a 2 position connector. The range for Output A is 0.5 to 4.5Vdc and the range for Output B is 4.5 to 0.5Vdc. The switch supply is from V_{BAT} and the solenoid supply is from V_{BAT}.



Model code

Code	Description
E0	standard handle
E1	handle w/ button

Code	Description
DN	manual detent
/ /	no option

Code	Description
L1	1 solenoid detent, (-) direction
L2	2 solenoid detents, (+) and (-) directions
L3	1 solenoid detent, (-) direction, 75%
/ /	no option

Code	Description
S	Saab (AMP)
D	Deutsch

Note:

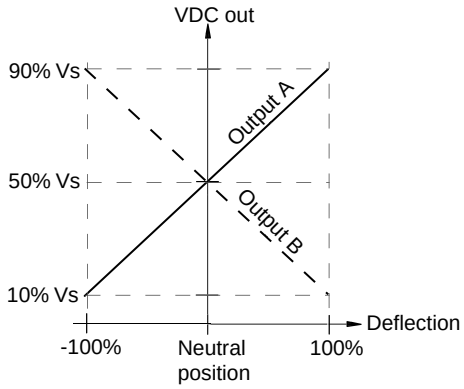
Not all option combinations are supported with ordering part numbers. The most commonly requested models are available for ordering.

Outputs

The graph to the right demonstrates the mirrored voltage outputs. Output A is 10% - 90% V_S and Output B is 90% - 10% V_S.

With a nominal 5Vdc supply, the range for Output A is 0.5 to 4.5Vdc and the range for Output B is 4.5 to 0.5Vdc.

Deflection vs. output diagram



Environmental Protection

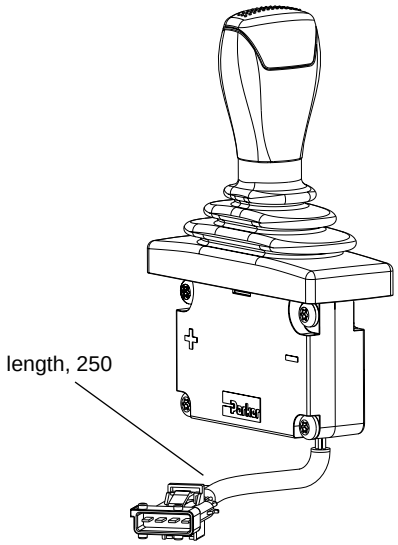
EMI
ISO 14982:1998, Radiated emission
EN 55022:2003, Conducted emission
ISO 11452-2:1995, Radiated Susceptibility
ISO 11452-4:2001, Conducted Susceptibility
ISO7637-3:1995, Conducted transient susceptibility
EN 61000-4-8:, Magnetic immunity

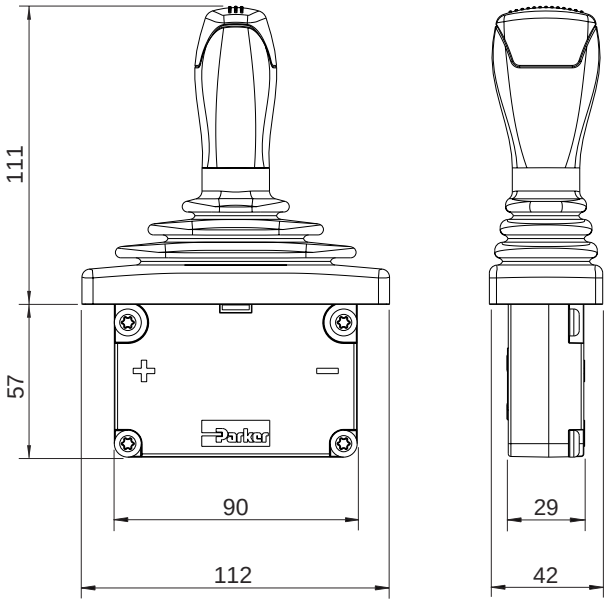
ESD
EN 61000-4-2, external
ISO TR 10605:2001, ESD

Mechanical environment
IEC 60068-2-64:1993 Fh, random
IEC 60068-2-29:1987 Eb, bump

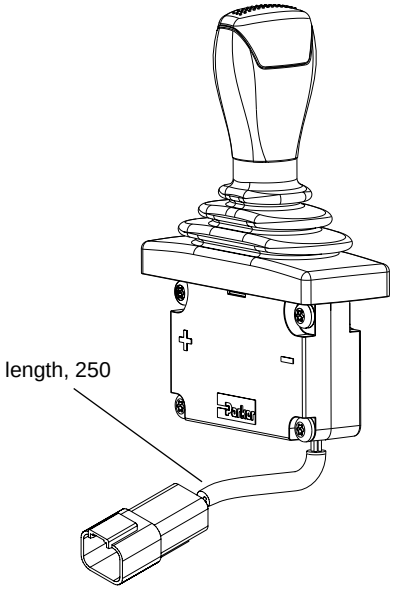
Climate environment
IEC 60068-2-1:1993 Ab, cold
IEC 60068-2-2:1993-01 Bb, heat
IEC 60068-2-3 Ca, damp heat, steady
IEC 60068-2-14:1984 Nb, temperature change
IEC 60068-2-18 Rb2, ISO529, IP66
IEC 60068-2-30:1985 Db, damp heat, cyclic

Chemical environment
IEC 60068-2-52:1996 Kb salt mist, cyclic





unit = mm



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IQAN-LST Input Devices

Electronic Control Systems

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Application

The IQAN-LST is a paddle style mini-lever in the IQAN product group. This lever focuses on compact design, weather resistance and safety.

The LST is a small single-axis joystick 0.5 - 4.5 Vdc, intended for the proportional control of one double-acting hydraulic function. The combination of a mini-lever and armrest can provide substantial ergonomic benefits. The LST can be mounted in the armrest or on the dashboard in mobile vehicles. It is easily actuated with a fingertip for good ergonomics.

Design and function

The IQAN-LST is lightweight with small installation dimensions. The LST also has low, well-adapted forces designed in for ease of operation in close quarters. The lever is covered with friction rubber on either side, to prevent the fingers from slipping and to provide a comfortable feel. Mounting screws are installed from underneath for a clean appearance of the dashboard, panel or armrest.

The IQAN-LST is designed for the outdoor environment. The electronics are potted and the cable has a choice of either a Saab sealed AMP junior-power timer connector or a Deutsch DT series transportation connector. . These features combine to give the LST an IP66 rating.

The IQAN-LST is a spring centered, dual sensor device. The dual sensors provide 0.5 - 4.5 Vdc and 4.5 - 0.5 Vdc outputs which allows error checking to meet high safety requirements. All inputs and outputs are protected against short circuit to ground. It is well suited as a control unit for a variety of valve drivers. The LST fits to the IQAN platform and is designed to meet typical environmental stresses in mobile hydraulic applications.

General

Weight	0.04 Kg
Rated power supply (V_S)	5 VDC
Load resistive (min.)	1K Ω
Load capacitive (max.)	1 µF
Current consumption	16 mA

Mechanical

Angle of movement	±30°
Expected life (operations)	5 million

Environment

Operating temperature	-40° to 70 °C
Sealing	IP66

Analog outputs

Active range (VDC out)	10%-90% V_S
Resolution	<2mV

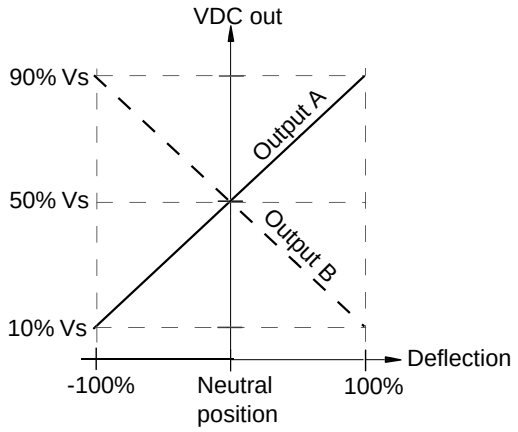
Connectors

S	Saab (AMP/Tyco JPT)
D	Deutsch DT04

Ordering part numbers

IQAN-LST-S	20011381
IQAN-LST-D	20014070

Deflection vs. output diagram



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Environmental Protection

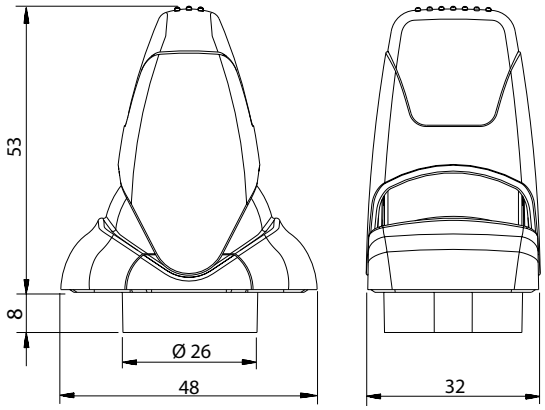
EMI
ISO 11452-2 (immunity vs EM field)
ISO 14982 (radiated emission)
ISO 11452-4 (immunity vs injected RF)
ISO 7637-2 (immunity vs supply transients)
EN61000-4-8 (immunity vs magnetic field)

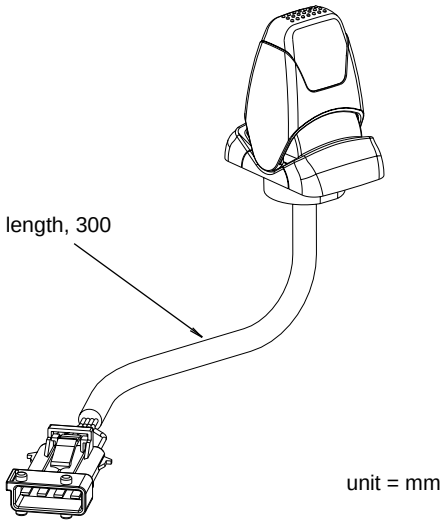
ESD
EN 61000-4-2 (external)
ISO TR 10605 (external)

Mechanical environment
IEC 68-2-64 Fh (random)
IEC 68-2-29 Eb (bump)

Climate environment
IEC 68-2-18 Rb3 (water)
IEC 68-2-30 Db (var1, damp, cyclic)
IEC 68-2-3 Ca (damp, heat steady state)
IEC 68-2-2 Bb (heat)
IEC 68-2-1 Ab (cold)
IEC 68-2-14 Nb (change of temperature)

Chemical environment
IEC 68-2-52 Kb (salt mist, cyclic)





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IQAN-LL/LM I/O Modules

Electronic Control Systems

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Application

IQAN-LM

The IQAN-LM is especially suitable for continous duty machine operations such as in forestry and construction work. The combination of a mini lever and armrest provide substantial ergonomic benefits.

IQAN-LL

The IQAN-LL is designed for rough handling. The ergonomic design gives good support to the arms and wrists and assures a comfortable grip from several angles. The design allows operators to quickly become familiar with the lever.

Design and function

Both levers are designed for in-cab use. The wide operating voltage range allows for connection to both 12 VDC and 24 VDC systems. All inputs and outputs are protected against short circuit to ground and to main power supply.

The IQAN levers are connected to other modules through a CAN bus which makes data exchange more efficient, simplifies installation and increases noise immunity.

A number of different handle types are available. LED indicators show supply voltage and internal operation.

The lever units are lightweight with small installation dimensions and have low, well-adapted actuating forces.

All proportional inputs are of contactless inductive type with neutral position sensors to provide high safety and reliability.

General

Weight	LM 0,4 Kg LL 0,9 Kg
Rated power supply	12 – 24 VDC
Min/max power	9 / 32 VDC
Operating temperature	-30 to +70°C
Protection	in-cab use IP65 (type LM-2A) IP44 (all others)
Current consumption (idle)	57 mA (28 VDC), 46 mA (14 VDC)
Data interface	Parker ICP (IQAN CAN Protocol)

Axis sensors

Number	max 3 pcs, inductive
Resolution	9 bit

Neutral position detection

Signal	IR-sensor, on/off

Digital inputs

Number	10 pcs, 4 internal, 6 external (may differ according to application/handle)
Signal range	0 – 5 VDC 0 – V_{BAT}
Active range	”0” = 0,0 – 1,0 VDC, ”1” = 2,0 – V_{BAT}

Analog inputs

Number	2 pcs
Signal range	0 – 5 VDC 0 – V_{BAT}
Active range	0,5 – 4,5 VDC
Resolution	5 mV

Digital outputs[1]

Number	1 pc
Signal	200 mA

1) One digital input and the digital output share the same physical pin. By configuring the channels with IQAN software, the user defines the pin as input or output.

Ordering part number

IQAN-LL-2E2	20005956
IQAN-LL-2N0	20005957
IQAN-LL-2N2	20005958
IQAN-LL-2N2T	20005959
IQAN-LL-2N4	20005960
IQAN-LL-2U	20005961
IQAN-LL-3G	20005956
IQAN-LM-2A	20005963
IQAN-LM-3D	20005964

Order code

IQAN-LM

Example IQAN-LM-3D

Unit type code
Number of axis
Handle type

Unit type code:	product description LM - lever mini
Number of axis:	2 - X, Y 3 - X, Y, Z
Handle type:	
A straight stick	diameter 15 mm
D ergonomic shape handle	prop. rocker for Z axis

IQAN-LL

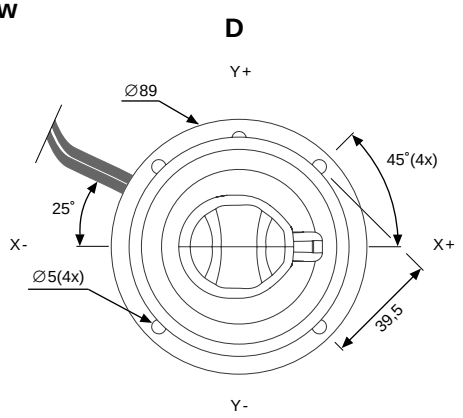
Example IQAN-LL-2N2T

Unit type code
Number of axis
Handle type

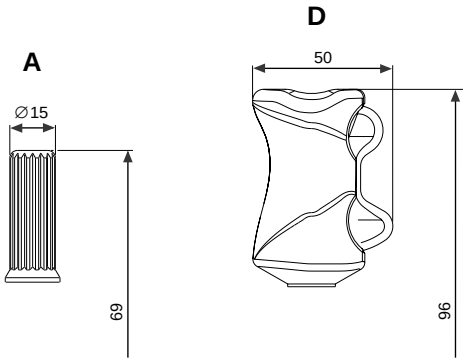
Unit type code:	product description LL - lever large
Number of axis:	2 - X, Y 3 - X, Y, Z
Handle type:	
E2 straight handle	(on)-off-(on) rocker
G mushroom shape handle	prop. rocker for Z axis
U stem	without handle
N0 banana-shape handle	no buttons
N2 banana-shape handle	2 buttons
N2T banana-shape handle	2 buttons + trigger
N4 banana-shape handle	4 buttons

IQAN-LM

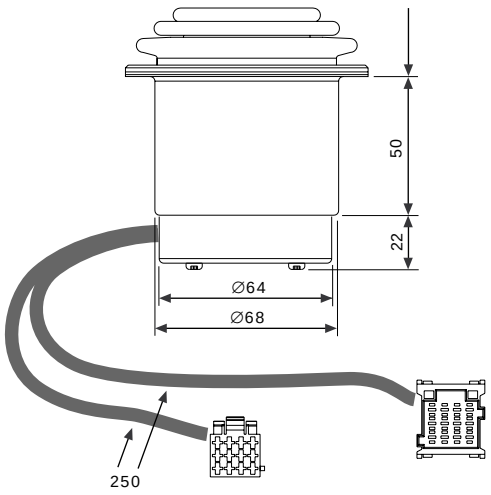
Top view



Handle types



Base unit



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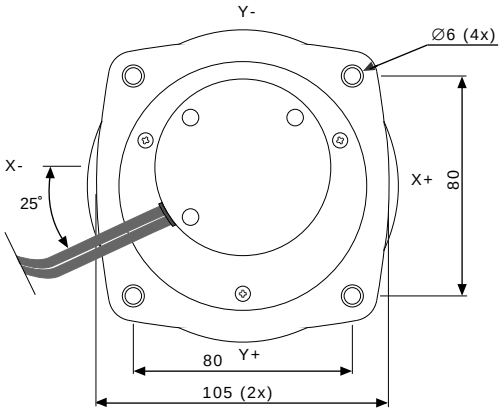
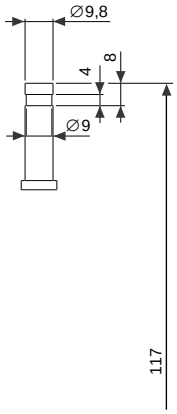
IQAN-LL

Bottom view



Handle types

U



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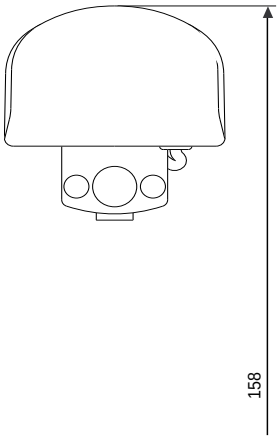
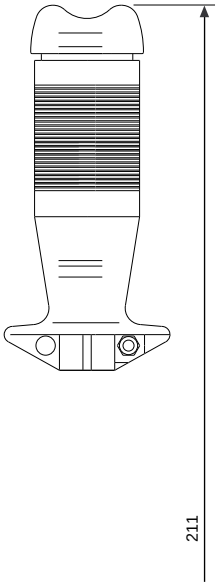
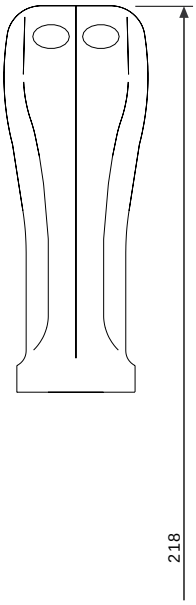


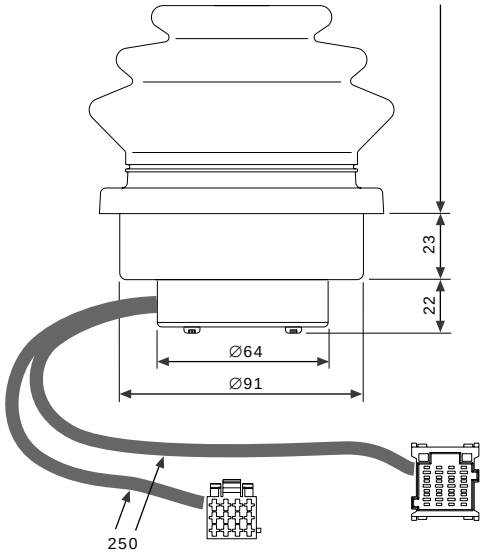
E2



N2 (N0, N2T, N4)



Base unit



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Environmental Protection

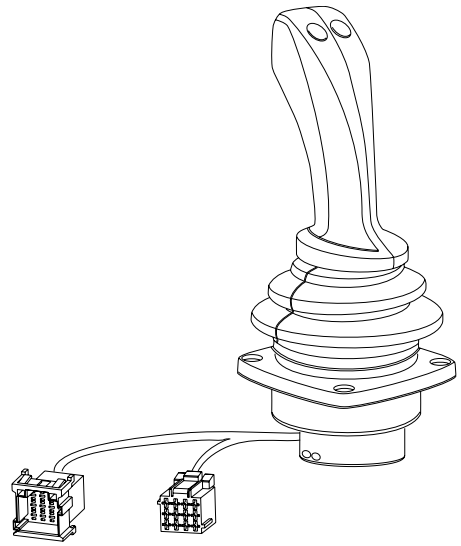
EMI
EN 55022:1994 (conducted emission)
EN 55022:1994 (radiated emission)
ISO 11452-2:1995 (immunity vs EM field)
ISO 11452-4:1995 (immunity vs injected RF)
ISO 7637-2:1990 (immunity vs supply transients)
ISO 7637-3:1995 (immunity vs supply transients)
EN 61000-4-8:1993 (immunity vs magnetic field)

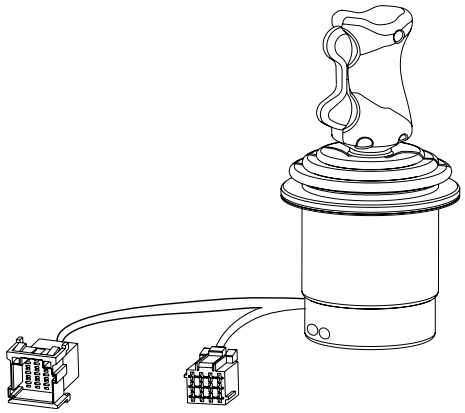
ESD
ISO 10605:2001 (ESD)

Mechanical environment
IEC 68-2-64:1993 Fh (random)
IEC 68-2-29:1987 Eb (bump)

Climate environment
IEC 68-2-18:2000 Rb3 (water)
IEC 68-2-30:1985 Db (var1, damp, cyclic)
IEC 68-2-3:1969 Ca (damp, heat steady state)
IEC 68-2-2:1993-01 Bb (heat)
IEC 68-2-1:1993-02 Ab (cold)
IEC 68-2-14:1984 Nb (change of temperature)

Chemical environment
IEC 68-2-52:1996 Kb (salt mist)





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IQAN-LF1
Input Devices

Electronic Control Systems

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Application

Typical applications for an electric accelerator pedal include speed control of a mobile machine with an electric engine speed actuator, E-gas. The IQAN-LF1 pedal may be combined with an IQAN-XT2 to proportionally control a hydrostatic transmission. The pedal can also be used as a brake pedal or as an inch pedal.

Design and function

The pedal frame and the pedal plate are made of black-anodized sheet metal, which results in a sturdy construction. The pedal pivots around a through shaft with dual bushings. The plate is rubber coated to prevent slipping. The enclosed electric potentiometer is located under the pedal to protect against mechanical damage. The pedal motion is transmitted to the potentiometer through a linkage with ball-joints. The pedal has a mechanical bottom stop so no external forces can reach the potentiometer. The potentiometer is a high cycle, plastic-hybrid type and for safety reasons, has a built in neutral indicator switch. Both the potentiometer and the switch have additional built-in protective resistors that prevent them from being destroyed by an electric short circuit. The electric connector is well protected against dirt and mechanical damage but is easily available for plug-in and troubleshooting.

Properties

This pedal is designed to be very flexible when it comes to correct ergonomic location and a good looking environment in the cab. The activation force has been carefully selected for operator comfort. Mounting on a horizontal cab floor will give a good starting and final angle for the pedal. The pedal requires 3 mounting screws. The other section of this datasheet shows the mounting pattern and connector configuration.

General

Weight	1,6 kg
Operating temperature	-40 °C to +80 °C
Sealing	IP 54
Start angle	36,5°
Final angle	17°
Activation point, switch	2,5°
Activation torque, start	3,5 Nm
Activation torque, final	8 Nm
Max. load	1000 N
Sensing pot. resistance	1 kohm
Protective resistor, pot.	1 kohm
Protective resistor, switch	1 kohm
Signal range at 5V supply	0,4 to 3,2 V
Signal, neutral switch active	0,8 V
Expected life	$2X10^6$ cycles
Electrical connector	AMP, timer
Mating connector kit	Part no. 5031022

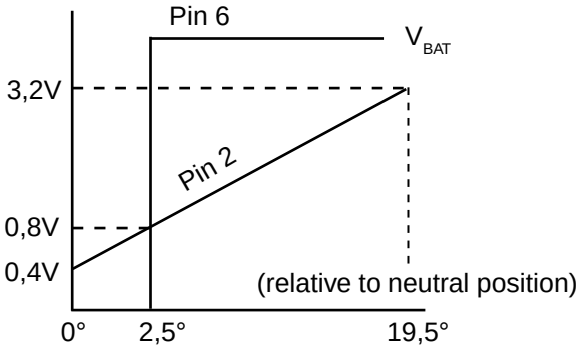
Connector configuration

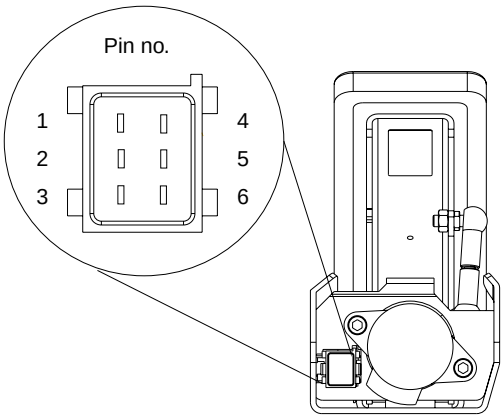
Pin 1: not used
Pin 2: analogue output signal
Pin 3: + 12/24V neutral switch supply
Pin 4: + 5Vref potentiometer supply
Pin 5: - Vref potentiometer ground
Pin 6: neutral switch signal

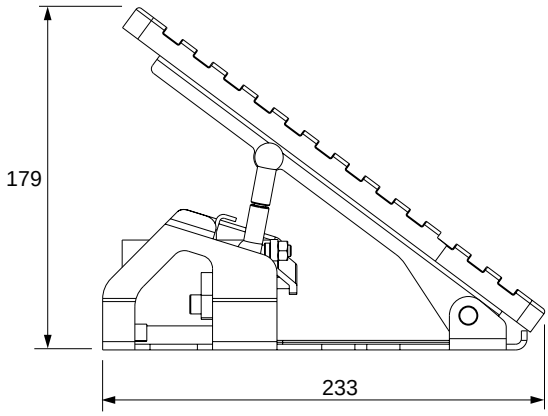
Ordering part number

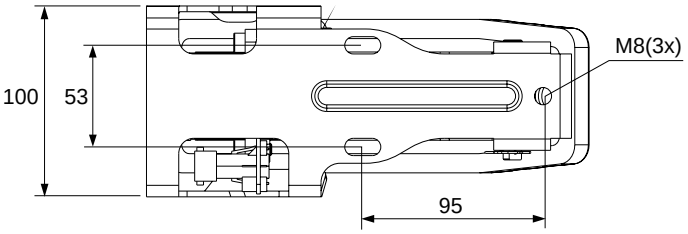
IQAN-LF1	5010011

Angle vs. output diagram









unit = mm

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IQAN-LC5-X05 Input Devices

Electronic Control Systems

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Application

The IQAN-LC5-X05 is a large, coordinate joystick that incorporates ruggedness, functionality, light weight with high flexibility for mobile market applications. The unit is extremely robust, able to withstand aggressive conditions during outdoor use and in outdoor installations, including EMI, vibrations and a wide temperature range. The IQAN-LC5-X05 features a compact ergonomic design making it ideal for armrest and panel installations in mobile equipment. Fourth generation ICL4 type joysticks are easily replaced with the IQAN-LC5-X05.

Design and function

The mechanical life is greatly increased over previous generations of joysticks. Full stroke force “one time loading” in any direction is >100 Nm. The torsional strength has more than doubled, compared to the previous generation.

The IQAN-LC5-X05 is designed for outdoor use. The housing is rated IP65 above the flange, and has an integrated Deutsch transportation connector. The handle cable may be routed completely through the main, non-corrosive housing. This makes field mounting of new handles or replacing a bellow very easy to accomplish. In case of water ingress (i.e. a damaged bellow), the built-in drainage from this design will protect the electronics.

All proportional output signals are of contactless Hall effect type with dual sensors to provide redundancy for high safety and reliability. This make it easy for the application designer to meet high safety requirements functions by using IQAN software. The primary signal for each axis is 10%-90% of supply voltage. The corresponding secondary signal is 90%-10% of supply voltage.

The joystick has a heavy duty stem and tough base material for long life. The precise force configuration makes it easy to feel X and Y direction.

The IQAN-LC5-X05 is made using selected components and conforms to strict international requirements.

General (Lever base)

Weight	0.37 kg
Rated power supply (V_S)	5 VDC
Load resistive (min.)	4.5K
Load capacitive (max.)	1 µF
Current consumption	16 mA (5VDC)

Mechanical (Lever base)

Angle of movement	±18°
Expected life (full stroke cycles)	5 million
Lever force in neutral, XY	0.6 Nm
Full actuated, XY direction	1.4 Nm
One time loading (max.)	100 Nm

Environmental (Lever base)

Temperature range	
Operating, ambient	-40 to +85° C
Storage, ambient	-40 to +100° C
Sealing (above flange)	IP65

Electrical (Lever base)

Over voltage range	11Vdc @ 10 minutes

Connection

Electrical connection	Deutsch DTM, 6 pos.

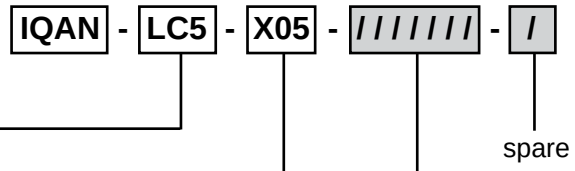
Analog outputs

Active range (Vdc out)	10%-90% V_S
Resolution	<2 mV)

Ordering part numbers

IQAN-LC5-X05-U1 / / / / /	20076317
IQAN-LC5-X05-U2 / / / / /	20076318
IQAN-LC5-X05-H1 / / / / /	20076319

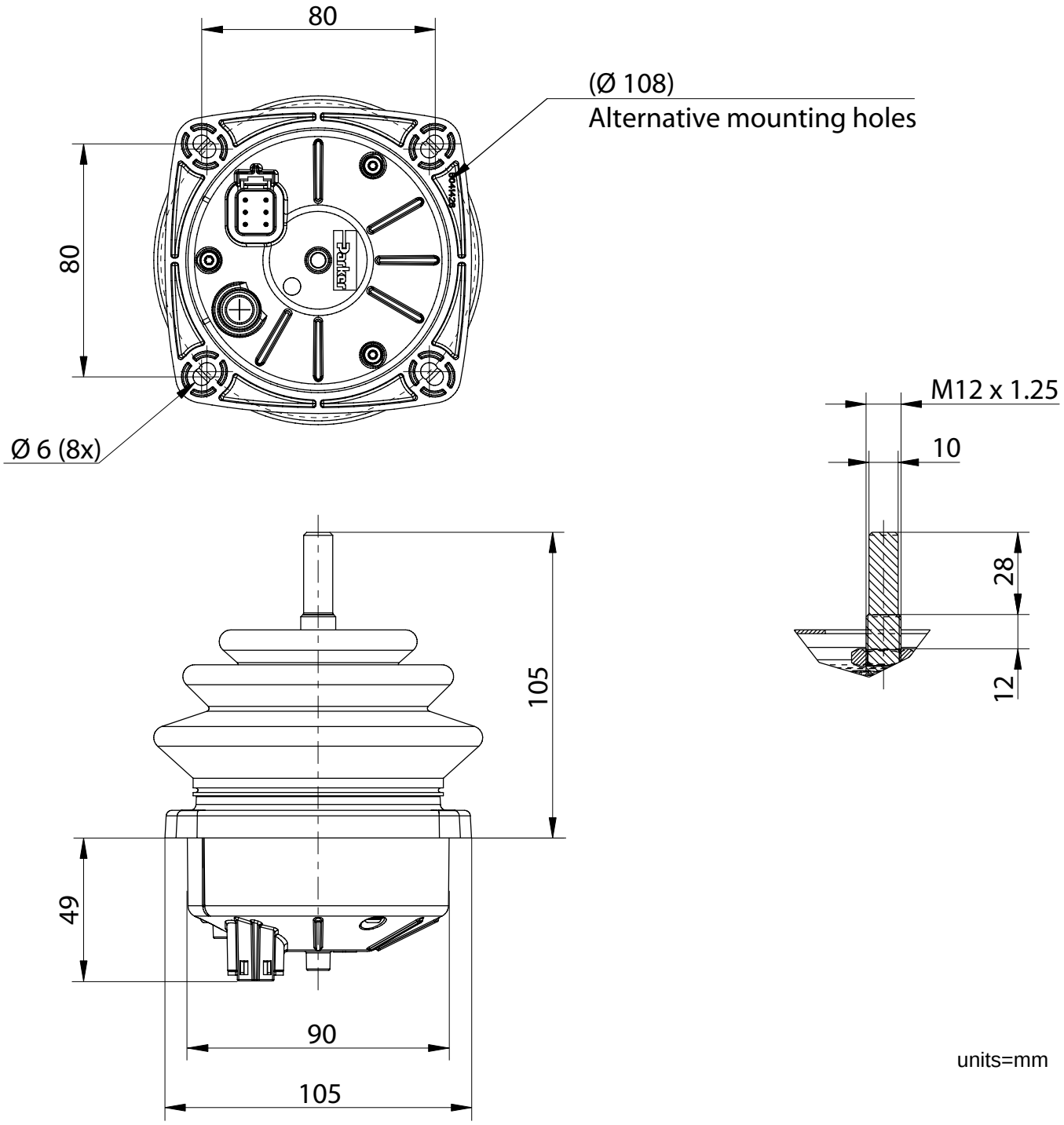
Model code



Code	Description
L	lever
C	co-ordinate
5	fifth generation

Code	Description
X	Crossed outputs
0	0 VDC min range
5	5 VDC max range

Code	Description
U1 / / / / /	no handle, without bellow
U2 / / / / /	no handle, with bellow
H1 / / / / /	Handle, ball knob, Ø50mm [Ø2.0”]



units=mm

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Environmental Protection

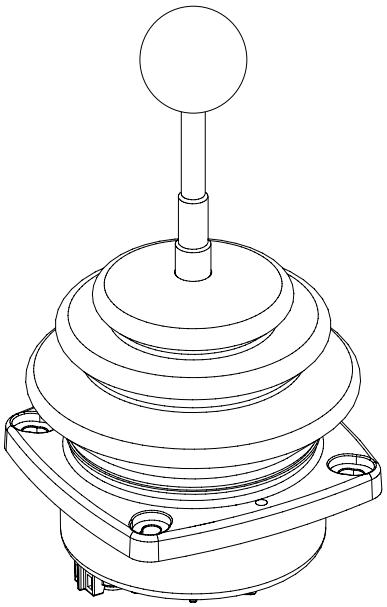
EMI
ISO 13766/ISO 14982 (radiated emission)
EN 55025:2003 (conducted emission)
ISO 11452-4:2005 (conducted susceptibility)
ISO 11452-2:2004 (radiated susceptibility)
ISO 7637-3:2007 (immunity vs supply transients)

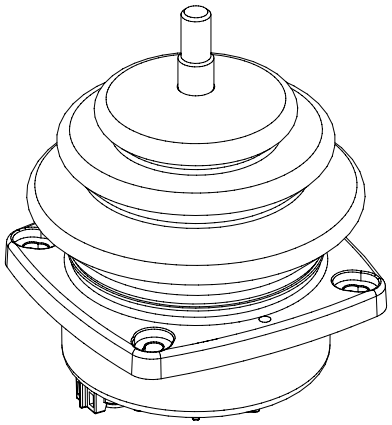
ESD
ISO 10605:2001, (Handling)

Climate Environment
IEC 60529:2001 IP65 (water)
IEC 60068-2-78:2001 (damp heat, steady state)
IEC 60068-2-30 :1985 Db (var1,damp,cyclic)
IEC 60068-2-14:1984 Nb (change of temp.)
IEC 60068-2-2:1993 Bb (dry heat)
IEC 60068-2-1:1993 Ab (cold)

Mechanical
IEC 60068-2-29:1987 Eb (bump)
IEC 60068-2-64:1993 Fh, Fh (random vibration)

Chemical environment
IEC 60068-2-52:1996 Kb (salt,mist,cyclic)





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IQAN-SP Sensors

Electronic Control Systems

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Application

The IQAN-SP pressure transducers belong to the family of IQAN accessories developed to complement IQAN control systems. IQAN-SP is a range of 0-5V pressure transducers for mobile hydraulic applications. These transducers are available in two pressure ranges; 35 bar (500 psi) and 500 bar (7300 psi). To make the sensors suitable for mobile equipment, we have focused upon properties such as reliability, electromagnetic immunity and ease of installation.

Properties

Reliability

The IQAN-SP has stainless steel construction for strength. The sensor cells use thin film technology with no internal o-rings or fluid. The high pressure capability makes the sensor very robust and able to withstand heavy vibrations.

Electromagnetic immunity

The design of the IQAN-SP has an EMI cap that separates the sensor electronics from the connector. This ensures a high level of EMI protection.

Installation

The two interface types of the IQAN-SP are well designed for the mobile hydraulics industry.

The first type, -B, has a G1/4 thread. The hex of the transducer has an integrated face seal to eliminate sealing washers. The integral 3 pin connector is a sealed Bosch/AMP Timer type designed for automotive use.

The second type, -D, has a SAE 6 (9/16”-18UNF) thread and an o-ring seal. The connector is a 4 pin Deutsch DT type and is attached via a short cable.

Both connector types give the sensor IP65 protection for exposed outdoor applications. These features provide for easy installation and removal, even in field conditions.

General

Weight	0.06 kg
Operating temperature	-40 °C to 125 °C
Storage temperature	-40 °C to 140 °C
Pressure range	
SP035	0 - 35 bar,
SP500	0 - 500 bar
Over pressure	
SP035	Max 100 bar
SP500	Max 1050 bar
Burst pressure	
SP035	Min 150 bar
SP500	Min 1500 bar
Total error (-40°C to 105°C)[1)]	Max 4.0 % FS
Total error (40°C to 80°C)[1)]	Max 1.0 % FS
Response time[2)]	5.0 msec

1) Total accuracy includes non- linearity, hysteresis, repeatability and temperature effects.
2) Measured from initial value to output at 90%.

Electrical specifications

Output at FS [3)]	4.5 V
Zero output [3)]	0.5 V
Supply Voltage(Vs)	5.0+/-10% Vdc [4)]
Current supply	Max 12.5 mA
Load resistor	Min 5 kΩ
Load capacitor	Max 0.1 µF

3) The output is ratiometric to supply voltage (Vs)
4) The max supply voltage with sensor operating is 6 Volt. (switch off app. 6.2Volt)

Threaded interfaces

B	1/4”-19 BSP with integral face seal
D	9/16”-18 UNF, SAE 6 with nitrile o-ring

Connectors

B	Bosch - AMP Timer
D	Deutsch DT04-4P

Orderable unit codes

IQAN-SP035-B ordering part no.	G1/4 with Bosch 5020026
IQAN-SP035-D ordering part no.	SAE 6 with Deutsch 2820008
IQAN-SP500-B ordering part no.	G1/4 with Bosch 5020027
IQAN-SP500-D ordering part no.	SAE 6 with Deutsch 2820009

Environmental Protection

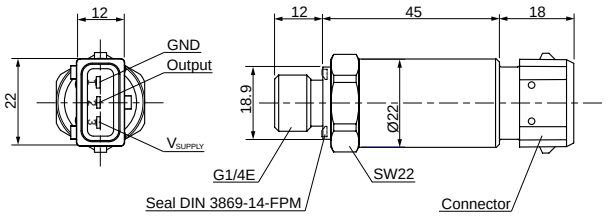
EMI
ISO 11452-2 (immunity vs EM field)
ISO 14982 (radiated emission)
EN 55022 (conducted emission)
ISO 11452-4 (immunity vs injected RF)
ISO 7637-2 (immunity vs supply transients)

ESD
EN 61000-4-8 (external)

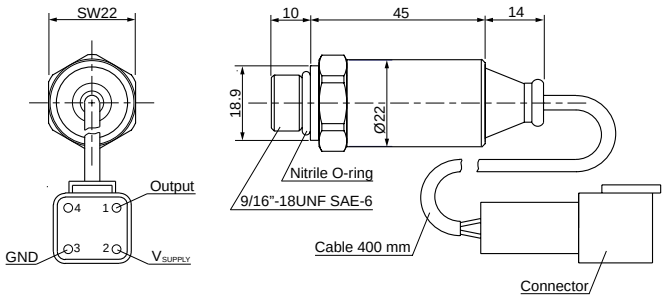
Mechanical environment
IEC 60068-2-64 Fh (vibration)
IEC 60068-2-27 Es (shock)
IEC 60068-2-29 Eb (bump)

Climate environment
IEC 60068-2-18 Rb3 (water)
IEC 60068-2-30 Db (var1, damp, cyclic)
IEC 60068-2-3 Ca (damp, heat steady state)
IEC 60068-2-2 Bb (heat)
IEC 60068-2-1 Ab (cold)
IEC 60068-2-14 Nb (change of temperature)

Chemical environment
IEC 60068-2-52 Kb (salt mist, cyclic)



IQAN-SPxxx-B



IQAN-SPxxx-D

unit = mm

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IQAN-ST Sensors

Electronic Control Systems

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Application

The IQAN-ST temperature transducer belongs to the family of IQAN accessories developed to complement IQAN control systems. IQAN-ST is a new 0-5V output temperature transducer for mobile hydraulic applications. This transducer is available in three interface types; G1/4 BSP, M10 and 9/16”-18 UNF SAE 6. The G1/4 BSP and M10 sensors have an integral Bosch automotive connector. The SAE 6 sensor has a short cable-mounted Deutsch connector. To make the sensor suitable for mobile equipment, we have focused upon properties such as reliability, electromagnetic immunity and ease of installation.

Properties

Reliability

The IQAN-ST has stainless steel construction for strength. The PT100 sensor uses thin film technology with internal amplification. All versions of the sensor have high pressure capability. The IQAN-ST is very robust and able to withstand heavy vibrations.

Electromagnetic immunity

The design of the IQAN-ST has an EMI cap that separates the sensor electronics from the connector. This ensures a high level of EMI protection.

Installation

The IQAN-ST is well designed for the mobile hydraulics industry. The 3 pin integral Bosch connector is a sealed AMP Junior Timer type. The Deutsch connector is the DT04 type. Both connectors are designed for automotive use. These connectors give the sensor IP65 protection for exposed outdoor applications. The hex of the G1/4 BSP and M10 versions of the transducer have integrated face seals to eliminate loose sealing washers. The SAE 6 sensor type has a factory installed 0-ring. These features provide for easy installation and removal, even in field conditions.

Specifications

General

Weight	50 g
Operating temperature	-50 to 150°C
Protection	outdoor use
Pressure rating	
G (1/4 BSP)	Max 700 bar
M (M10)	Max 350 bar
U (SAE 6)	Max 1000 bar

Electrical

Voltage supply V_S	5±0.5 Vdc
	Max 6 Vdc
Current consumption	5.0 µA
	Max 7.5 µA
Total error (25°C)	1%
Total error (-40 to 150°C)	4%

Output

FS (150°C)	4.75 Vdc
Zero (-50°C)	0.25 Vdc
Span	4.50 Vdc
Ratiometricity	1%
Linearity	1% FS

Threaded interfaces

G	1/4”-19 BSP with integral face seal
M	M10 x 1, with integral face seal
U	9/16”-18 UNF, SAE 6 with nitrile o-ring seal

Connectors

B	Bosch -AMP Junior Timer
D	Deutsch DT04-4P

Orderable unit codes

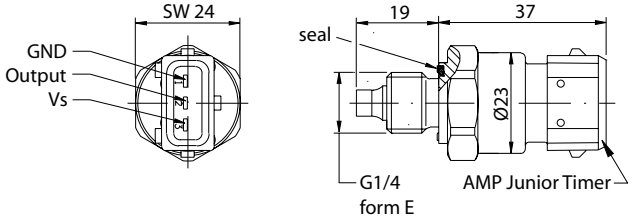
IQAN-ST-G-B	G1/4 with Bosch
ordering part no.	20073657
IQAN-ST-M-B	M10 with Bosch
ordering part no.	20073659
IQAN-ST-U-D	SAE 6 with Deutsch
ordering part no.	20073658

Environmental Protection

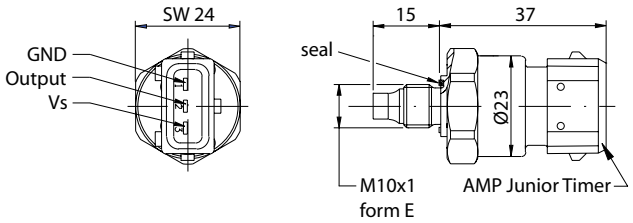
EMI
EN 55022 (radiated emission), <30 dBµV/m
ISO 11452, T5 (immunity vs EM field), 200 V/m
EN 61000-4-6 (immunity vs injected RF), 10 V
EN 61000-4-4 (immunity vs supply transients), 1 kV

Mechanical environment
IEC 60068-2-64 (vibration), 0.4 g²/Hz, 1.5 to 250 kHz
IEC 60068-2-27 (shock)

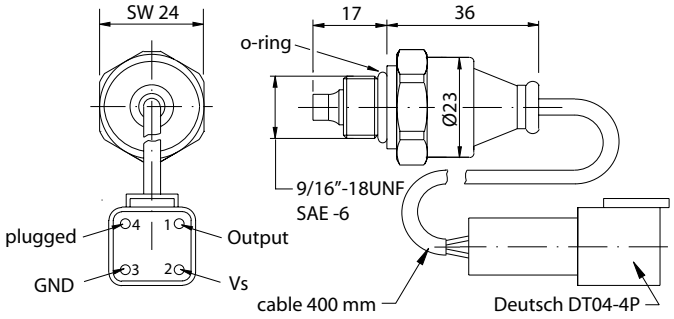
Climate environment
IEC 60529 (water), IP65



IQAN-ST-G-B



IQAN-ST-M-B



IQAN-ST-U-D

unit = mm

⚠ WARNING

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The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

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aerospace
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pneumatics
process control
sealing & shielding

IQAN Sensors

Electronic Control Systems

Parker

ENGINEERING YOUR SUCCESS.

IQAN by Parker has a variety of sensors to meet your pressure and temperature monitoring needs. Additionally, the Parker Sensor Business Unit designs and manufactures innovative sensors and switches for off-road vehicles, heavy trucks, construction equipment, agriculture equipment and a variety of general applications. These sensors use proven reliable technologies along with unique electro-magnetic circuits to deliver SMART sensors and switches capable of multiple functions, all in one economical, environmentally sealed package.

IQAN by Parker sensors and other Parker sensors that complement IQAN electronic control systems are an important part of any machine.

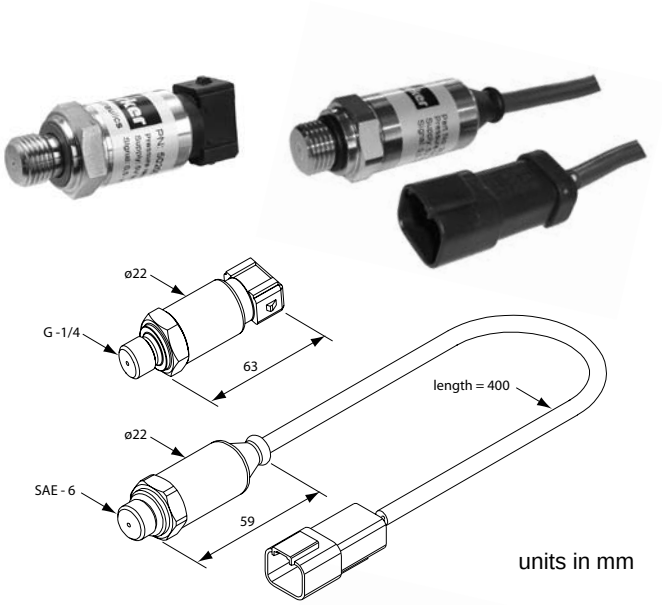
Pressure sensors

IQAN-SP035- /

The IQAN-SP035 pressure transducer is a 35 bar (500 psi), 0-5V pressure transducer for mobile hydraulic applications. This transducer is available in two interface types;

Option B has an integrated Bosch automotive connector and G1/4 BSP threads.

Option D has a short cable mounted Deutsch DT automotive connector and SAE 6 (9/16”-18 UNF) threads.



Ordering part numbers

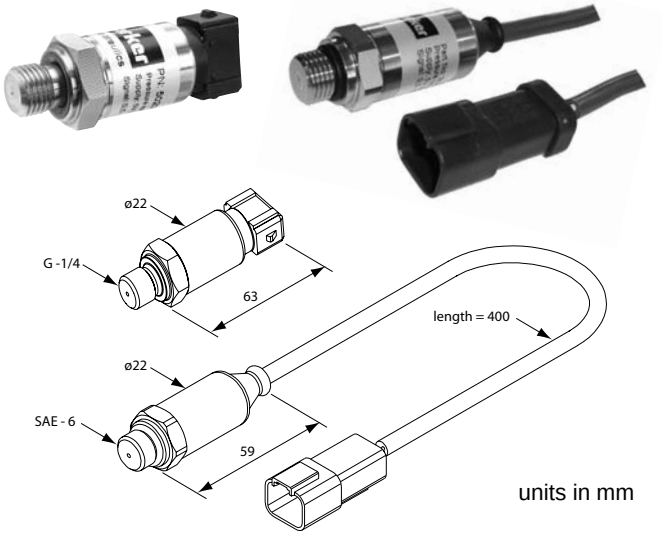
IQAN-SP035-B	5020026
IQAN-SP035-D	2820008

IQAN-SP500- /

The IQAN-SP500 pressure transducer is a 500 bar (7300 psi), 0-5V pressure transducer for mobile hydraulic applications. This transducer is available in two interface types;

Option B has an integrated Bosch automotive connector and G1/4 BSP threads.

Option D has a short cable mounted Deutsch DT automotive connector and SAE 6 (9/16”-18 UNF) threads.



Ordering part numbers

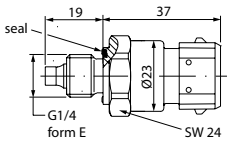
IQAN-SP500-B	5020027
IQAN-SP500-D	2820009

Temperature sensors

IQAN-ST- / - /

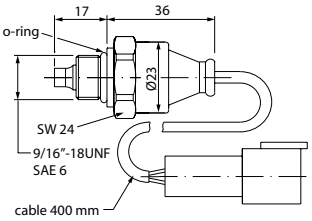
The IQAN-ST temperature transducer is a -50°C to +150°C, 0-5V output active temperature transducer for mobile hydraulic applications. This transducer is available in three interface types;

Option G has G1/4 BSP threads and has a type B integral Bosch automotive connector.



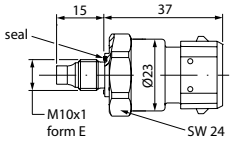
IQAN-ST-G-B

Option U has SAE 6 (9/16”-18 UNF) threads and a type D short cable mounted Deutsch DT automotive connector.



IQAN-ST-U-D

Option M has M10x1 threads and has a type B integral Bosch automotive connector.



IQAN-ST-M-B

units in mm

Ordering part numbers

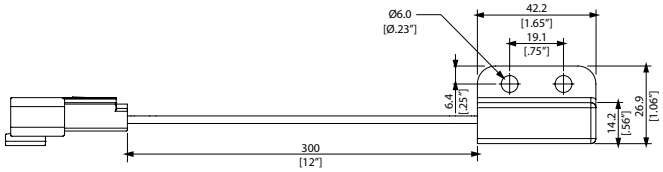
IQAN-ST-G-B	20073657
IQAN-ST-U-D	20073658
IQAN-ST-M-B	20073659

Ferrous proximity sensors

The FP series of proximity sensors are normally open, ferrous proximity sensors for mobile hydraulic applications and will sense ferrous objects.

FP2000 proximity sensor is a 6.4 mm (1/4”) airgap sensor with 300 mm (12”) wire leads and a 2 position Deutsch DTM connector.

FP3000 proximity sensor is a 12.7 mm (1/2”) airgap sensor with 300 mm (12”) wire leads and a 2 position Deutsch DTM connector.

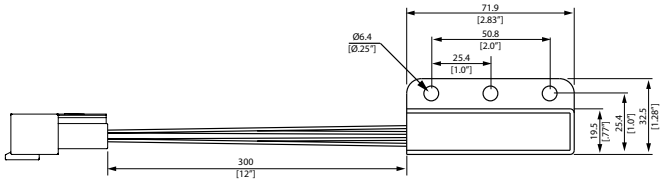


FP2000/FP3000

FP4000 proximity sensor is a high power, 6.4 mm (1/4”) airgap sensor with 300 mm (12”) wire leads and a 4 position Deutsch DTM connector.

Ordering part numbers

FP2000	01695
FP3000	01699
FP4000	01703



FP4000

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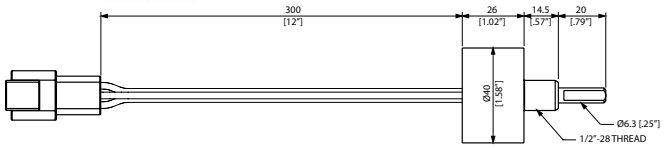
Mölnlycke, Sweden

Rotary sensors

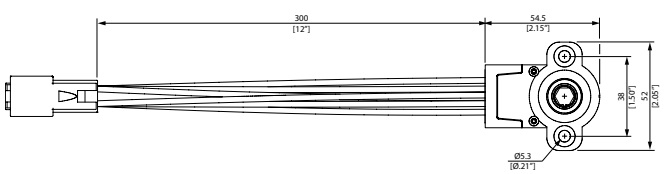
RF50

RF50 rotary friction sensor is a 0-5Vdc output, non-contact, friction lock rotary control for mobile hydraulic applications. The sensor has anodized aluminum construction and potted, sealed electronics. A locating flat on the 1/2”-28 UNEF threaded mount provides for easy alignment. The RF50 has twelve inch wire leads and an attached 3 position Deutsch DTM connector.



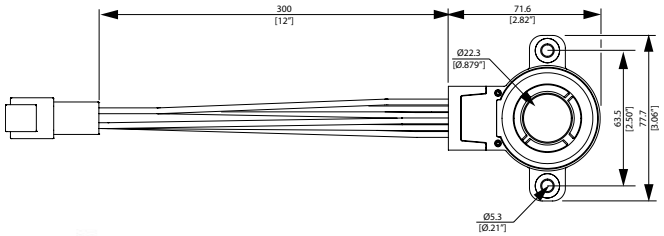
RS70

The RS70 rotary sensor is a 0-5Vdc, dual output, non-contact, spring return, 170° rotary sensor for mobile hydraulic applications. The sensor has glass-filled, nylon plastic construction and potted, sealed electronics. A hexagonal coupling and two roll pins in the body provide for easy alignment. The RS70 has twelve inch wire leads and an attached 6 position Deutsch DTM connector.



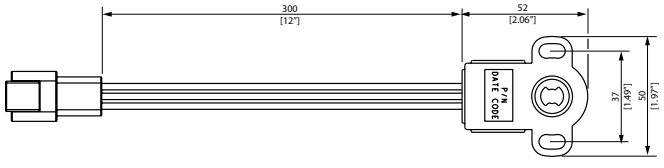
RS60

The RS60 rotary sensor is a 0-5Vdc, dual output, non-contact, spring return, 120° rotary sensor for mobile hydraulic applications. The sensor has glass-filled, nylon plastic construction and potted, sealed electronics. The through-hole coupling allows the flexibility to mount the sensor anywhere along the length of a rotating shaft. The RS60 has twelve inch wire leads and an attached 6 position Deutsch DTM connector.



RS52

The RS52 rotary sensor is a 0-5Vdc output, non-contact, spring return, 90° rotary sensor for mobile hydraulic applications. The sensor has glass-filled, nylon plastic construction and potted, sealed electronics. A versatile coupling and slotted mounting holes provide for easy alignment. The RS52 has twelve inch wire leads and an attached 3 position Deutsch DTM connector.



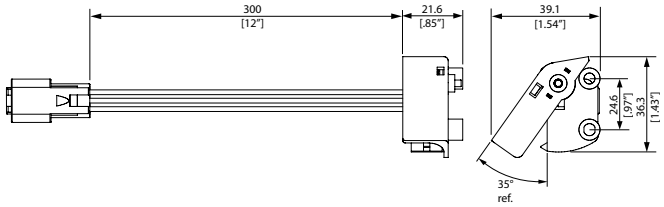
Ordering part numbers

RF50	01705
RS70	01707
RS60	01708
RS52	01709

Linear sensors

ADS50

The ADS50 linear motion sensor is a 0-5Vdc output, non-contact, spring return, lever actuated sensor for mobile hydraulic applications. The sensor has glass-filled, nylon plastic construction and potted, sealed electronics. The sensor outputs a linear signal over 25.4mm (1.0”) of travel. Extra large mounting holes provide for easy alignment. The ADS50 has twelve inch wire leads and an attached 3 position Deutsch DTM connector.



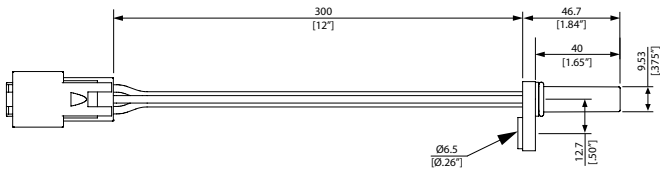
Ordering part number

ADS50	01710

Speed sensors

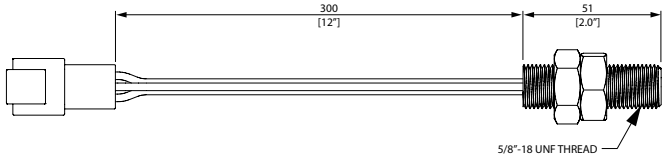
GS50

The GS50 geartooth sensor is a digital output, non-contact, speed sensor for mobile hydraulic applications. The sensor has glass-filled, nylon plastic construction and potted, sealed electronics. A single offset flange mounting hole provides for easy alignment. The GS50 has twelve inch wire leads and an attached 3 position Deutsch DTM connector.



GS60

The GS60 geartooth sensor is a digital output, non-contact, speed sensor for mobile hydraulic applications. The sensor has stainless steel construction and potted, sealed electronics. The 5/8”-18 UNF fully threaded body provides for easy alignment and adjustment. The GS60 has twelve inch wire leads and an attached 3 position Deutsch DTM connector.



Ordering part numbers

GS50	01711
GS60	01712

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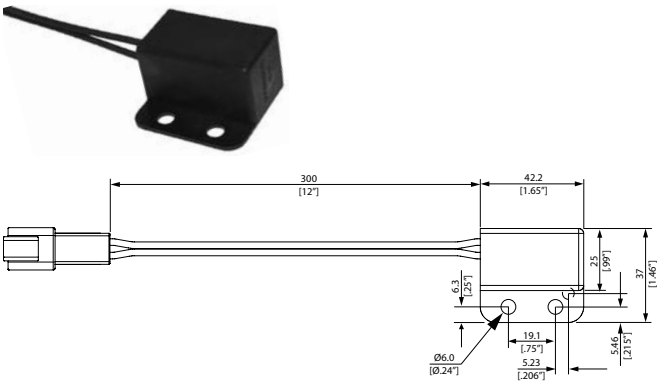
Mobile Controls Division Europe
Mölnlycke, Sweden

Tilt sensors

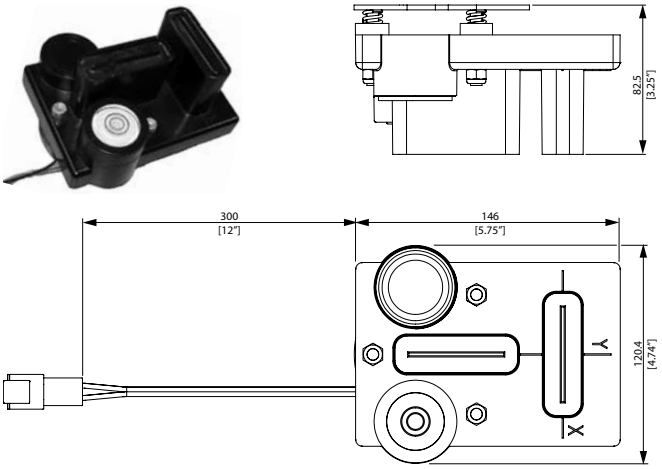
RM50

The RM50 rolling magnet switch is a one axis tilt switch for mobile hydraulic applications.The sensor has glass-filled, nylon plastic construction and potted, sealed electronics. Large mounting holes and a locating pin provide for easy alignment. The RM50 has twelve inch wire leads and an attached 2 position Deutsch DTM connector.



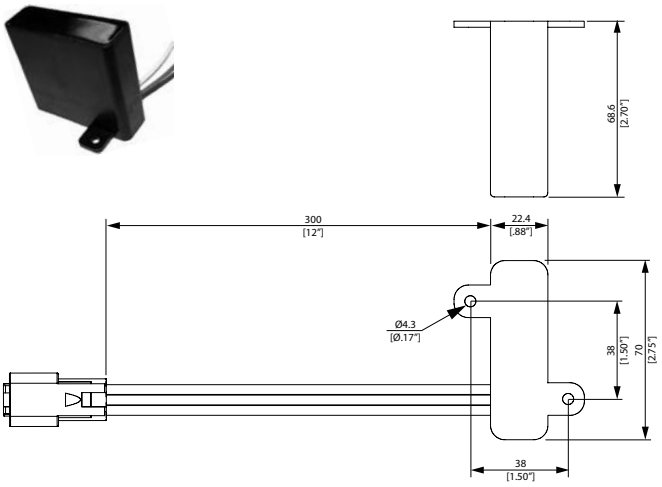
ATS90

The ATS90 dual axis sensor is a 0-5Vdc, dual output, non-contact, Hall effect angle/tilt sensor for mobile hydraulic applications. The sensor has ABS plastic construction and potted, sealed electronics. A built-in bubble level and three point mounting provide for easy installation and setup. The ATS90 has twelve inch wire leads and an attached 4 position Deutsch DTM connector.



ATS50

The ATS50 single axis sensor is a 0-5Vdc, single output, non-contact, Hall effect angle/tilt sensor for mobile hydraulic applications. The sensor has ABS plastic construction and potted, sealed electronics. The mounting holes are extra large for easy alignment. The ATS50 has twelve inch wire leads and an attached 3 position Deutsch DTM connector.



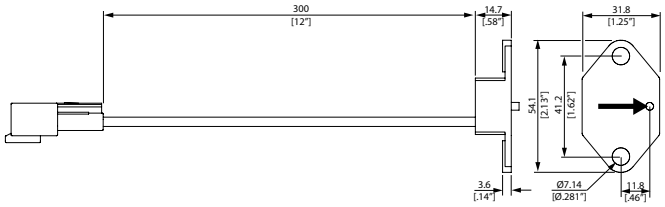
Ordering part numbers

RM50	01715
ATS90	01716
ATS50	01759

Acceleration sensors

ACC50

The ACC50 acceleration sensor is a 0-5 Vdc output accelerometer used to sense vibration, impact, tilt and motion for mobile hydraulic applications. Large mounting holes and a locating pin provide for easy alignment. The ACC50 has twelve inch wire leads and an attached 3 position Deutsch DTM connector.



Ordering part number

ACC50	01767

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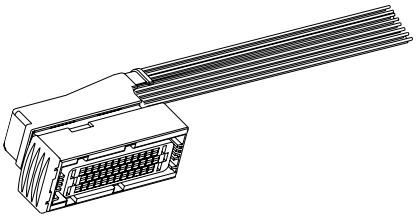
IQAN Accessories

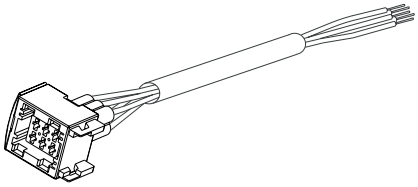
Electronic Control Systems

Prototype installation cables

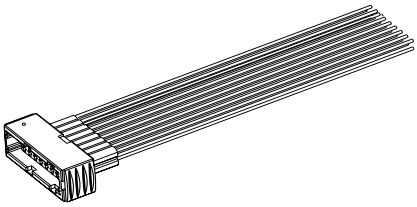
5030025
C1-cable: 2,5 meters, fits to IQAN-XP, -XS
(-MDL with minor modification)
5030030
C1-cable: 2,5 meters, fits to IQAN-XP2, -XT2,
(-TOC8, -XA2, -XS2, -MC2 with minor modification)



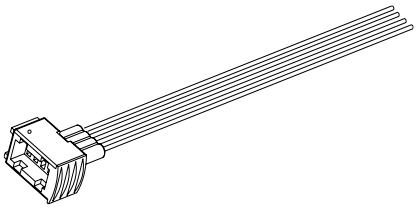
5030029
IQAN-MDM-cable: 2,5 meters



5030090
C1-cable: 2,5 meters, fits to IQAN-TOC2



5030094
4 pin JPT: 2,5 meters, fits to IQAN-LSL, -LST



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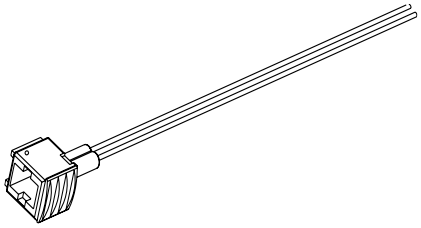
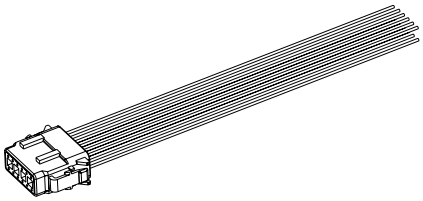
Prototype installation cables

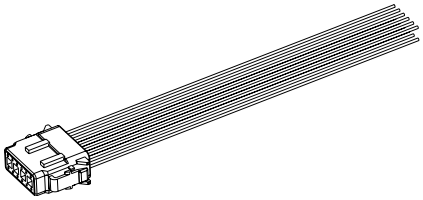
5030095
2 pin JPT: 2,5 meters, fits to IQAN-LSL



5030125
C1-cable: 2,5 meters, fits to IQAN-MD3
Grey, key A (for power, clock, CAN and RS232)

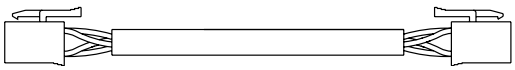


5030126
C2-cable: 2,5 meters, fits to IQAN-MD3
Black, key B (for inputs, output, USB and VREF)



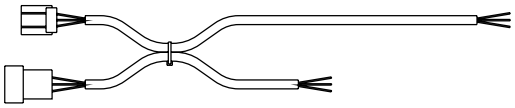
Communication cables

5030008
CAN-cable: 2,5 meters, fits to IQAN-XP, -XS

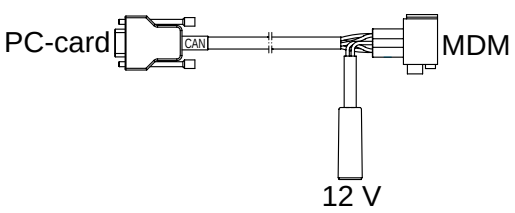


5030024
RS232-cable: 1,5 meters, fits to IQAN-MDM
(for PC connection to IQANdevelop, included in the IQANdevelop kit)

5030027
Lx-CAN/PWR: 2,5 meters, fits to IQAN-LL/LM
Lx-I/O: 1 meter, fits to IQAN-LL/LM

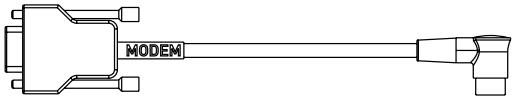


5030034
Interface-cable: for IQANsimulate
(included in the IQANdevelop Professional kit)

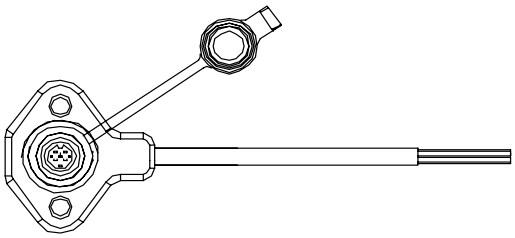


Communication cables

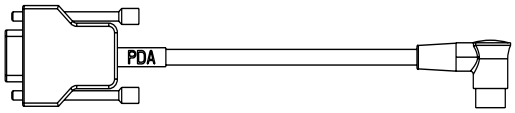
5030080
Remote diagnostics cable: 1,5 meters, fits to IQAN-MDM (for modem)



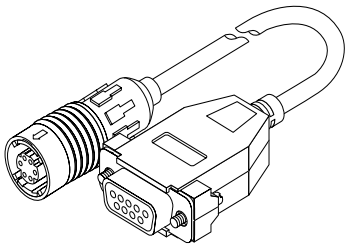
5030089
Panel mount serial adapter cable: 1 meter, fits to IQAN-TOC2, -TOC8.
(Allows use of 5030024, 5030080 and 5030096)



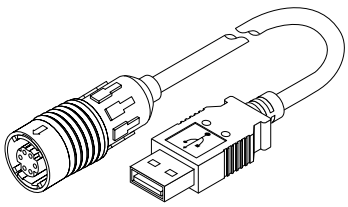
5030096
RS-232 cable: 1,5 meters, for PDA



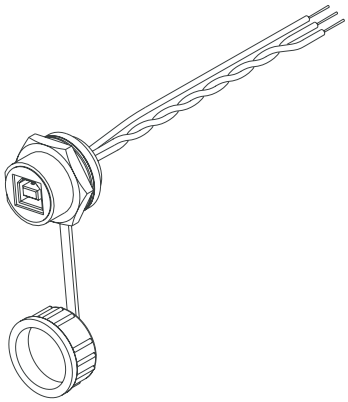
5030103
RS-232 cable: 1,5 meters, fits to IQAN-MDL
(for connection to IQANdesign platform software)



5030110
USB cable: 1,5 meters, fits to IQAN-MDL
(for connection to IQANdesign platform software)

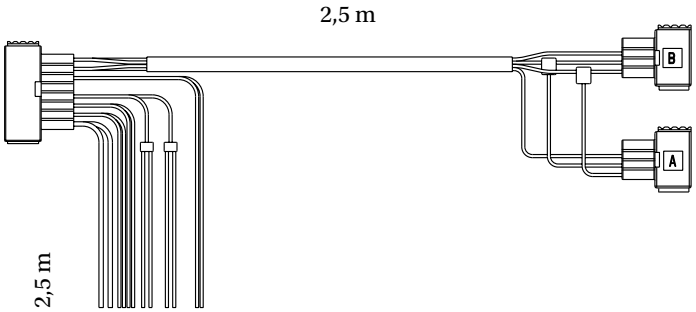


5030124
Panel mount USB adapter cable: 1 meter, fits to IQAN-MC2, -MD3

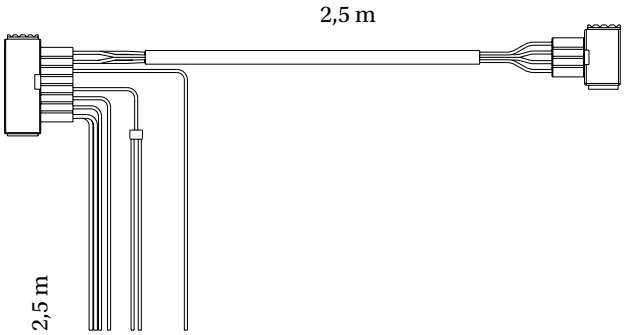


System cables

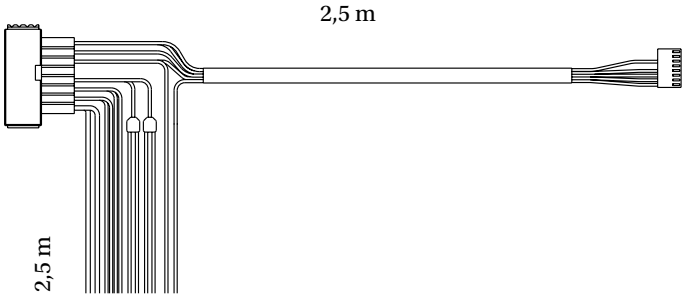
5030087
IQAN-TOC2 +2x IQAN-LST or LSL
2,5 meters



5030092
IQAN-TOC2 + 1x IQAN-LST or LSL
2,5 meters



5030093
IQAN-TOC2 +1x ICL427
2,5 meters



Address and termination

Id-Tag (Address units)
Fits to IQAN-Lx, -XP2, -XT2, -XA2, -XS2
ordered in 10-pack only, use Ordering No.

Address Id-Tags

Address	Part No.	Ordering No.	Resistance (ohms)
0	5030040	5030060	287
1	5030041	5030061	590
2	5030042	5030062	976
3	5030043	5030063	1.5K
4	5030044	5030064	2.26K
5	5030045	5030065	3.4K
6	5030046	5030066	5.36K
7	5030047	5030067	9.53K

Address with termination Id-Tags

Address	Part No.	Ordering No.	Resistance (ohms)
0T	5030050	5030070	432
1T	5030051	5030071	768
2T	5030052	5030072	1.21K
3T	5030053	5030073	1.82K
4T	5030054	5030074	2.74K
5T	5030055	5030075	4.22K
6T	5030056	5030076	6.98K
7T	5030057	5030077	14K

Termination unit
CAN Bus termination, fits to IQAN-XP, -XS
ordered in 10-pack only, use Ordering No.

Termination Tag

Function	Part No.	Ordering No.	Resistance (ohms)
Termination	5030082	5030083	120

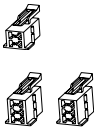
Connector kits

Includes all housings, contacts and seals for each unit.

Temperature sensor (old)
Part / Ordering No: **5031007**

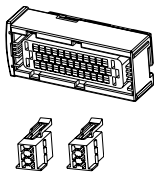
Part	pcs.	AMP No.
Housing	1	963040-3
Contact JPT	2	929940-1
Seal JPT	2	828904-1

IQAN-XP, -XS (old -DG)
Part / Ordering No: **5031015**



Part	pcs.	AMP No.
Housing	1	929504-1
Contact JPT	12	929940-1
Housing	2	929504-2

IQAN-XP, -XS
Part / Ordering No: **5031016**

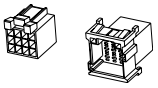


Part	pcs.	AMP No.
Housing	1	1-963226-1
Cover	1	962371-1
Contact JPT	17	927779-1
Contact MT	40	962945-2
Housing	2	929504-2

IQAN-MDM, -LF1
Part / Ordering No: **5031022**

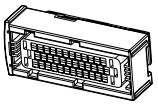
Part	pcs.	AMP No.
Housing	1	1-963212-1
Contact JPT	6	929940-1
Seal JPT	6	828904-1
Cavity plug	1	828922-1

IQAN-LL, -LM
Part / Ordering No: **5031048**



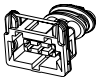
Part	pcs.	AMP No.
Housing	1	1-967622-1
Contact JPT	10	927779-1
Contact JPT	12	2-963745-1
Second lock	2	967632-1
Housing	1	1-967627-1

IQAN-X_2, -TOC8, -MDL, -MC2
Part / Ordering No: **5031063**



Part	pcs.	AMP No.
Housing	1	1-963226-1
Contact JPT	6	929929-1
Contact MT	36	963711-2
Seal JPT	6	828905-1
Seal MT	36	963530-1
Cover	1	962371-1

IQAN-SP035, -SP500, -ST
Part / Ordering No: **5031086**



Part	pcs.	AMP No.
Housing	1	282191-1
Contact JPT	3	929940-1
Seal JPT	3	828904-1

Connector kits

Includes all housings, contacts and seals for each unit.

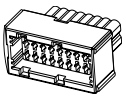
IQAN-LSL, -LST
Part / Ordering No: **5031097**

Part	pcs.	AMP No.
Housing	1	1-963207-1
Contact JPT	4	929940-1
Seal JPT	4	828904-1

IQAN-LSL (switch / detent options)
Part / Ordering No: **5031098**

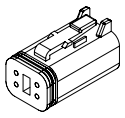
Part	pcs.	AMP No.
Housing	1	1-963210-1
Contact JPT	2	929940-1
Seal JPT	2	828904-1

IQAN-TOC2
Part / Ordering No: **5031105**



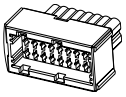
Part	pcs.	AMP No.
Housing	1	1-963217-1
Contact JPT	16	929940-1
Seal JPT	16	828904-1

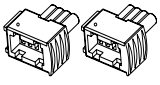
IQAN-LSL, -LST, -SP, -ST
Part / Ordering No: **5031113**



Part	pcs.	Deutsch No.
Housing	1	DT06-4S-C015
Wedge	1	W4S
Contact	4	1062-16-0122

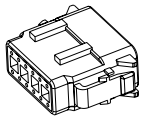
IQAN-TOC2 system
IQAN-TOC2, 2x IQAN-LSL, 1x ICL4
Part / Ordering No: **5031124**

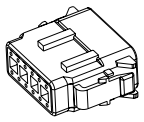




Part	pcs.	Parker No.
Conn. kit	1	5031105
Conn. kit	2	5031097
Conn. kit	1	5031125

IQAN-MD3, C1 & C2, grey & black
Part / Ordering No: **20073081**





Part	pcs.	Deutsch No.
Housing	1	DTM06-12SA
Housing	1	DTM06-12SB
Wedge	2	WM12S
Contact	24	1062-20-0222
Sealing plug	24	0413-204-2005

Crimping tools

5031061
IQAN tool kit

Consists of	use	Color	Part No.
Crimp tool	JPT* no seal	Yellow	5031049[1)]
Crimp tool	JPT* with seal	Red	5031050[1)]
Crimp tool	MT** seal/no seal	Blue	5031051[1)]
Extraction tool kit	All types	All	5035003[2)]
Pin box	Spare parts	All	5031057[2)]

* Junior Power Timer
** Micro Timer
[1)]Not available as separate items, only part of IQAN tool kit
[2)]Available as separate item

5035003
Extraction tool kit, included in IQAN tool kit

Consists of	use	Color	Part No.
Extraction tool	JPT*	Yellow	5031053[1)]
Extraction tool	JPT* (for single latch CAN or Sensor connectors)	Red	5031054[1)]
Extraction tool	MT**	Blue	5031055[1)]

*Junior Power Timer
** Micro Timer
[1)]Not available as separate items, only part of Extraction tool kit

Crimping tools

5031057
Pin box, included in IQAN tool kit

Includes pin	Wire size	pcs.	AMP No.
JPT* no seal	0.75 mm² (18 AWG)	50	927779-1[1)]
JPT* no seal	1.5 mm² (14 AWG)	25	927777-1[1)]
JPT* with seal	0.75 mm² (18 AWG)	50	929940-1[1)]
JPT* with seal	1.5 mm² (14 AWG)	25	929938-1[1)]
JPT* with seal	0.75 mm² (18 AWG)	25	2-963745-1[1)]
JPT* seal	0.75 mm² (18 AWG)	50	828904-1[1)]
JPT* seal	1.5 mm² (14 AWG)	25	828905-1[1)]
JPT* cavity sealing plug	n/a	25	828922-1[1)]
MT** no seal	0.75 mm² (18 AWG)	100	962945-2[1)]
MT** with seal	0.75 mm² (18 AWG)	100	963711-2[1)]
MT** seal	0.75 mm² (18 AWG)	100	963530-1[1)]
MT** cavity sealing plug	n/a	100	963531-1[1)]

* Junior Power Timer
** Micro Timer
[1)]Not available as separate items, only part of Pin box

Software

IQANdevelop platform

Contents: software package	Part no. 20005604 Read	Part no. 2005606 Change	Part no. 2004179 Develop	Part no. 20005607 PRO	contents: part no.
software CD	x	x	x	x	
software licence no.	x	x	x	x	
serial cable for -MDM	x	x	x	x	5030024
IQANsimulate software				x	
IQANsimulate cable				x	5030034

Software IQANdevelop Read-level is also available in a version without licence no. and can be downloaded from www.iqan.com.
Printed user manual is not included. Please contact Parker Catalogue Services.

IQANdesign platform
IQAN Studio softwares

Contents: software package	Part no. 20073643 IQAN Creative Studio	Part no. 20073644 IQAN Productive Studio	Part no. 20073642 IQAN Active Studio
software CD	x	x	x
software licence no.	x	x	x

Communication cables are not included. Please choose cables to fit your requirements from page 3.
Printed user manuals are not included. Please contact Parker Catalogue Services.

IQAN software user manual cross-reference

IQAN software package	IQAN Creative Studio	IQAN Productive Studio	IQAN Active Studio	IQANdevelop software
User manual publication no.	HY17-8396/UK	HY17-8397/UK	HY17-8398/UK	HY17-8336/UK

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